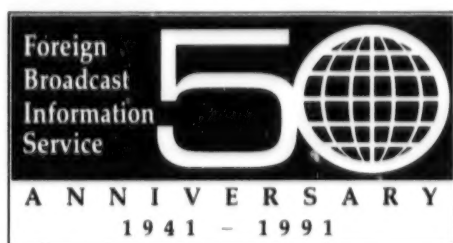


JPRS-EST-91-015
9 AUGUST 1991



JPRS Report

Science & Technology

***Europe
Economic Competitiveness***

Science & Technology

Europe

Economic Competitiveness

JPRS-EST-91-015

CONTENTS

9 August 1991

WEST EUROPE

S&T POLICY

EC Conforms Export Regulations to COCOM Rules [E. De Bony; Amsterdam COMPUTERWORLD, 5 Jun 91]	1
EC, ESA Debate Satellite Communications Liberalization [Alton INTERSPACE, 10 May 91]	1
Clear Policy for Aiding Europe's Electronics Industry Seen Lacking [W. Mock; VDI NACHRICHTEN, 3 May 91]	6
EC: Predominance of Major EUREKA Projects Criticized [B. Stam; Rijswijk POLYTECHNISCH WEEKBLAD, 23 May 91]	7
EUREKA Conference Approves East European Participation, HDTV Standard HD-MAC [Paris AFP SCIENCES, 20 Jun 91]	8
Eureka's Five-Year Anniversary: Successes, Failures Reported	9
Projects Reviewed [A. Kahn; Paris LE MONDE, 19 Jun 91]	9
R&D Commercialization [S. Seroussi; Paris LE MONDE, 18 Jun 91]	10
HDTV Standard HD-MAC Adopted [S. Seroussi; Paris LE MONDE, 20 Jun 91]	11
Five-Year Evaluation Report Gives EUREKA Mixed Reviews [A. Kahn; Paris LE MONDE, 19 Jun 91]	12
ES2 Chairman Predicts Information Technology Industry Decline [Amsterdam COMPUTABLE, 24 May 91]	13
France: INIST, INRIA R&D Centers Open [B. Maillard; Paris LE MONDE 4 Jul 91]	14
France: ANVAR's Role in Innovation Discussed	15
ANVAR as Partner [S. Brocas; Paris COURRIER ANVAR (ANVAR MAGAZINE supplement), Apr 91]	15
Innovation Funding [Paris COURRIER ANVAR (ANVAR MAGAZINE supplement), Apr 91]	21
Flanders Minister Revises S&T Policy [Zellik TECHNIVISIE, 15 May 91]	25
Germany: Cabinet Changes Threaten BMFT Chief Riesenhuber [Munich HIGHTECH, Jun 91] ..	25
Germany: Fraunhofer, Max Planck Organizations Compared [Duesseldorf HANDELSBLATT, 23 May 91]	26
Max Planck To Establish Institutes in Former GDR [Bonn DIE WELT, 4 Jun 91]	27
German Metalworkers Union Paper on Restructuring Eastern R&D [Duesseldorf HANDELSBLATT, 31 May-1 Jun 91]	27
Germany: BMFT Funds R&D At Daimler-Benz [Bonn DIE WELT, 23 May 91]	28
Germany: Post-Unification Research Integration Report [Bonn TECHNOLOGIE-NACHRICHTEN MANAGEMENT-INFORMATIONEN, 30 Apr 91]	29
Germany: Carl Zeiss Privatization Plans Outlined [Duesseldorf HANDELSBLATT, 14-15 Jun 91]	31
Italy's Role in European Research Programs Evaluated [Milan ITALIA OGGI, 19 Jun 91]	31
Italian EC Commissioner Reviews Computer Science Policy [Filippo Maria Pandolfi Interview; Turin MEDIA DUEMILA, May 91]	32
Dutch Computer Firm Director Calls for Protectionist Measures [R. Mazure; Amsterdam COMPUTABLE, 31 May 91]	34

CORPORATE ALLIANCES

European Manufacturing Industry Alliances Formed [M. Scherer; Paris INDUSTRIES ET TECHNIQUES, 14 Jun 91]	34
European Companies Build Plastics Recycling Factory [Teddington NEW MATERIALS INTERNATIONAL, May 91]	35
Possible Philips, Siemens, Thomson IC Manufacturing Merger Debated [P. Guichardaz; Paris ZERO UN INFORMATIQUE, 10 May 91]	35

Thomson CSF, GEC Ferranti Conclude Radar Alliance [Paris <i>ELECTRONIQUE INTERNATIONAL HEBDO</i> , 6 Jun 91]	37
Thomson, SGS-Thomson Subsidiaries Form Semiconductor Joint Venture [Paris <i>LE MONDE</i> , 18 Jun 91]	37
Eureka Opens Membership to East European Countries [C. Chartier; Paris <i>LE MONDE</i> , 20 Jun 91]	38
Italian Companies Form Advanced Robotics Consortium [Milan <i>ITALIA OGGI</i> , 22 May 91]	38
Vulcain Engine Passes 600-Second Mark [J. Augereau; Paris <i>LE MONDE</i> , 18 Jun 91]	39

CORPORATE STRATEGIES

Ericsson CEO Calls For Euro-American Cooperation [Lars Ramqvist Interview; Paris <i>ELECTRONIQUE INTERNATIONAL HEBDO</i> , 13 Jun 91]	39
Denmark's Novo Nordisk Plans Expansion [Duesseldorf <i>HANDELSBLATT</i> , 30 Apr 91]	40
France: Canon CEO on European Strategy [Takenori Matsuoka Interview; Paris <i>ENTREPRISES & TELECOMMUNICATIONS</i> , Jun-Jul-Aug 91]	41
French Electronics Trade Deficit Analyzed [M. Heurteaux; Paris <i>ELECTRONIQUE INTERNATIONAL HEBDO</i> , 6 Jun 91]	45
Siemens Plans Market Offensive in Automation Technology Against Asian Competitors [Landsberg <i>PRODUKTION</i> , 2 May 91]	45
Germany: Top Laser Firms Cooperate to Block Japanese Competition [Landsberg <i>PRODUKTION</i> , 29 May 91]	46
Italian Conference Evaluates EC Biotechnology Prospects [Milan <i>ITALIA OGGI</i> , 26 Apr 91]	46
Sweden: Status of Ericsson's Telecommunications Activities [TELEFACTS, May 91]	47

EAST-WEST RELATIONS

Belgian Companies To Set Up Industrial Site in Warsaw [Groot-Bijgaarden <i>DE STANDAARD</i> , 17 Jun 91]	51
Thomson Consumer Electronics To Form Joint Venture in Poland [F. Lazare; Paris <i>LE MONDE</i> , 24 May 91]	52
Siemens's Past, Future in Hungary Discussed [L. Haklar, A. Gosztak Interview; <i>MAGYAR ELEKTRONIKA</i> , No 2, 1991]	52

EUROPE-ASIA RELATIONS

Japan's NEC Plans European Penetration Strategy [Zellik <i>INDUSTRIE</i> , Jun 91]	55
Japan Makes Inroads in EC Robot Market [R. Mieczkowski; Amsterdam <i>COMPUTABLE</i> , 31 May 91]	56
Fujitsu's EC Computer Market Penetration Strategy Outlined [R. Evans; Paris <i>ZERO UN INFORMATIQUE</i> , 10 May 91]	56
Nissan Establishes R&D Center in Belgium [Rijswijk <i>POLYTECHNISCH WEEKBLAD</i> , 23 May 91]	57
Japan's Omron Expands Dutch Electronics Production Plant [W. Heirbaut; Zellik <i>INDUSTRIE</i> , Jun 91]	57

S&T POLICY

EC Conforms Export Regulations to COCOM Rules

91AN0471 Amsterdam *COMPUTERWORLD* in Dutch
5 Jun 91 pp 5-6

[[Article by Elisabeth De Bony: "EC Brings Export Regulations in Line With COCOM"]]

[Text] The European Commission has hesitantly begun to harmonize the regulations of the 12 EC member states regarding the COCOM regulations which govern the export of strategic products. The EC Commission's initial intention was to put an end to the member states' national control systems over the exchange, among member states, of products usable for both civilian and military purposes.

However, the Commission reserves the right to make proposals regarding a European [export] license system, possibly in combination with a control procedure for actual weapons exports.

In an EC Commission communique dated 29 May, Martin Bangemann, commissioner for internal trade, explains that the present system of national control and export licenses is inconsistent with the European market's objectives. Not so much because they affect trade outside the EC, but rather because they hamper trade among member states. In its communique, the Commission explains that the existing control systems regarding trade among member states date from 1949, when the COCOM regulations were established in Paris to control exports to the Soviet Bloc. These internal control systems remained in force for fear that a protected product, once shipped to another EC country, could be exported to a country falling under COCOM's restrictions because of loose enforcement of the regulations. The communique concludes noting that the only way to get rid of the internal trade controls is to draw up harmonious, rigorous regulations.

It is also argued that the basic problem is not chiefly the application of national regulations to trade among member states, but rather the fact that each member state has its own regulations. This results in big differences as to which products are being controlled and why, the countries involved, and the control mechanisms and their enforcement.

According to the Commission, this ambiguity has led to a situation which is as complex as it is incomprehensible. Both the public and the companies affected by these regulations have to deal with this complexity. The Commission urges the member states to take three steps in order to make the control mechanisms uniform.

Each country should implement the regulations as they have been drawn up by COCOM which, in their entirety, should ensure a standard level of product protection, both in the area of licenses, and in that of control itself.

In addition, the standards associated with these regulations should be conform to the strictest level applicable within the member states.

Furthermore, close cooperation should be established among the officials responsible for research, for the granting of export licenses, and for control in the different member states.

The Commission also clearly states that it will examine whether additional measures need to be taken based on article 113 of the Treaty of Rome.

In this regard, the Commission suggests drawing up common lists of products to be controlled, as well as lists of forbidden destinations, standard export licenses, and equivalent penalties for infringements. Thus, the member states should gain confidence in each other's control systems for exports of specific products to non-EC countries.

A spokesman of the European Commission described Bangemann's approach as an initial step and as an exercise in building up the required confidence. He explained that the member states will only reach an agreement on the elimination of national control systems if they are convinced that the EC regulations meet the same high standards.

Although the EC has no figures available about the damage which is caused to companies by these regulations, the communique points out that a survey conducted in the United States last year by the National Association of Manufacturers revealed that 50 percent of the exports of American companies required preliminary approval by the officials before they could actually take place.

EC, ESA Debate Satellite Communications Liberalization

91WS0414J Alton *IN7ERSPACE* in English 10 May 91
pp 3-7

[Text] One of the more interesting papers received by Interspace recently has been the European Space Agency's reply to the European Commission's green paper on liberalisation of satellite communications. ESA's reply is based on its questioning of industry and business organisations. The significance of ESA's reply is that it addresses the issue of R&D expenditure.

ESA is prevented by its terms of reference from playing a significant role in non-space infrastructure development, the Telecommunications Operators (TOs) have chosen to play down the applications of satellites and industry has been discouraged by an uncertain market where prospects are hampered by regulation.

In its introduction, the Green Paper states that its main policy goal is the "working out of a common position on satellite communications, so that this new information medium can develop in a favourable environment, taking account of the general rules of operation and

exploitation of the network environment, as well as the competition rules of the Treaty and existing international commitments of the Member States".

It is not clear precisely what exactly is meant by "favourable environment", who is responsible for its creation and who should benefit from it. That the creation of a Single Market in satellite telecommunications will result in a favourable environment for all those involved in the various layers in the OPERATIONS sector is not challenged by anybody. Whether the same will hold true for those in the INDUSTRIAL SUPPLY sector is very much questioned by all those who have to face competition from non-European suppliers, based mainly in the USA and Japan. This concern is expressed in particularly strong terms by those involved in application developments, who cannot rely on ESA nor any national organisation for R&D support in their respective areas of activity. However, as will be seen later, even the aerospace industry is very worried and considers that the very existence of the European space capability is at stake.

ESA is of course very sensitive to such reactions since they reflect directly on its role and on the way it must carry out its mission.

General

Several respondents to the survey spoke of the dangers of opening up Europe to outside competition. This might be avoided with a period of transition. There is a need for demonstrations and pre-operational phases to prepare the introduction of new commercial services.

There is no evidence that satellites could significantly threaten the viability of the basic public telecommunications services, but the Telecom Operators (TOs) appear to continue to fear a significant shift of third party voice traffic from the terrestrial systems. On the other hand, satellites can serve more than niche markets, and these include Europe-wide and, in some cases, world-wide services which need measures adopted beyond the European Community.

Apart from the Eastern European market, there is an industry view that the policy outlined in the Green Paper would produce only a limited increase in the demand for satellite capacity. In the USA, VSAT systems use only 10 to 20% of the total space capacity.

The European space industry believes that the matter is of strategic importance and that there is a serious threat from American industry which has a huge advantage in its military market. Although it is not unanimously believed that Europe is uncompetitive with the USA, most thought that some sort of protection or support was required. For example, import controls or tariff barriers have been suggested, and EUTELSAT should in some way, be encouraged to continue to buy European satellites. Many believe that ESA should continue to support R&D.

The position in the earth segment sector is thought to be rather worse than in the space sector. The majority of firms interviewed thought American domination of the re-regulated VSAT market was inevitable. The key for Europe may be to invest in advanced complete systems for VSAT networks.

There is a difficulty in discussing policy in ignorance of the agencies that would administer it. The principle of separation into regulatory and operational functions is thought to be fundamental, and there is strong support for an independent and efficient European regulatory authority (EURO-OFTTEL or OFSAT) to ensure fair play.

There is widespread concern about the role of the TOs. Licensing should not be by the TO; in fact any involvement of the TOs in type approval and licensing will hinder development. Although it is already CEC policy that all regulatory functions will be carried out by agents of Government and not the TOs, the TO still remains the regulatory body in many countries, and procedures are used by TOs to protect their monopolies. TO involvement in regulatory procedures should be minimised as soon as possible.

Many are suffering under regulation and anticipate future problems. There is concern over onerous type-approval procedures. There should be no restriction on data/voice carriage, and interconnection with the public switched network should be governed by minimum regulation. The TOs should not be allowed to impede interconnection on the basis of criteria that cannot be verified. There is surely no problem in light traffic by-passing the main network.

An impression of Industry's comments on the fourteen specific proposals is given below.

Earth Segment

The range of opinions given reflects more on the ambiguities regarding the implementation of the Green Paper and associated worries outside the scope of the Green Paper, rather than disagreement on its intentions. The confusion over the CEC licensing approach is of particular note. There should be a licensing scheme for complete networks, not for individual stations.

The European Telecommunications Standard Institute (ETSI) and its activities are also of concern. Satellite operators should actively participate in the work of ETSI. More European Telecommunications Standards (ETS) will be needed than are now in preparation, and there is a need for interim measures (during ETS drafting).

A single European body for type-approval of stations is the ideal alternative to mutual recognition. It is also believed that type-approval of stations is unwarranted if it goes beyond external characteristics.

Space Segment

The CEC itself or an independent European body should be responsible for equitable access. Means are needed to control dominant players and prevent de-facto monopolies. Simplification of coordination is essential rather than just desirable.

Some proposals for implementation are said to be inconsistent with the proposed principles. For example, in a liberalized environment, there should be no need to have any protection against economic harm. There is also a contradiction between seeking cost-orientation of tariffs and at the same time wanting competition.

Changing the Eutelsat Operating Agreement would be a long business, with many signatories outside the EC. Changing the intergovernmental conventions underlying INTELSAT and INMARSAT would be even harder. Direct access to the space segment would be generally welcomed and is vital for private networks.

Mobile Service

Although mobile services (MSS) may have different characteristics from fixed services (FSS), a single licence should cover networks of mobile and fixed links, and regulation should be minimised in general.

These networks will comprise links between mobiles and base stations (MSS) and links between bases (FSS). A single licence should cover both. It is simpler to make no distinction between fixed and mobile services. The same network should be allowed to carry both fixed and mobile services.

There is a need for interim measures, as systems will become available before a directive could be in place.

A simplification proposed is that the same rules (i.e. not "equivalent" rules) for FSS should apply to mobiles. An ad-hoc working group should be set up to examine all the specific characteristics of mobile networks.

Broadcast Service

There is a strong plea that there should be no distinction between fixed and broadcasting services, and it is hoped that ETSI will not continue to work on the basis that there is a clear distinction between the two.

Among those who comment on the Directive imposing the use of MAC/Packet standards for satellite broadcasting, there is a majority who oppose it but admit that harmonisation is necessary. Discussion of the revisions to the Geneva Plan is urgently needed to help the development of HDTV.

Some Options for ESA

In the written submissions and the interviews, several proposals were made for action specifically by the Agency.

The ESA submission to the CEC should first of all reinforce the CEC position but should also call for some improvements, e.g. a strong plea for an independent European regulatory authority.

The roles of ESA and other non-profit R&D organisations must be part of a coherent satellite policy. There may be a case for an advanced institute for telecommunications that would be in charge of the overall R&D programme.

ESA must maintain a substantial satellite communications programme to aid the competitiveness of European Industry. The size of this programme and the level of funding should be such as to give European Industry a chance to develop resources and capabilities comparable to those of their American and Japanese competitors.

ESA programmes should be in new fields where Europe is the leader and all agree on the need for a strong presence.

- On-board switching could lead to very low-cost earth terminals and make some satellite systems more attractive than terrestrial systems.
- ESA should work on network management software for VSAT systems, but this will require a re-orientation of current ESA budgets.
- The earth station system designer must continuously develop new design generations. Even if the USA leads now in VSAT, this will not necessarily be true for future generations. There should be at least mutual understanding in the earth segment industry. ESA, the service providers and end users, if Europe is to benefit from these new opportunities.

ESA should sponsor market surveys and demonstrations, as well as continuing to extend the state-of-the-art in the space and earth segments. ESA and the CEC should work closely in providing systems for demonstration and pre-operational purposes which will be operated by a carrier.

There is a spectrum of opinion on the ESA R&D programme, ranging from limiting it to long-term R&D at one extreme, to putting emphasis on systems, software and experiments with developed systems at the other. All agree that ESA should support basic R&D work. Aerospace manufacturers think it is very important that ESA continue with and intensify their efforts on major development projects such as OLYMPUS, ARTEMIS and ARCHIMEDES. Some respondents think that commercial operators should be left to complete system developments while others think it important that ESA should be more involved in the operation of pilot services using new systems. It is strongly emphasised that the existing geographical return rules must be reviewed, because applying them on a programme-by-programme basis does not lead to commercial competitiveness.

The opinions of industry should be listened to rather than those of Government research bodies.

Specific Comments From ESA

Although European aerospace industry's performance on international satellite markets has improved over the years, its competitiveness with respect to its US counterparts remains rather modest. All in all, it has captured reasonable share in terms of prime contractorship out, expressed in terms of overall industrial contribution, the picture is less optimistic and the results leave a lot to be desired. In the purely private markets (e.g. ASTRA and BSB) and, of course, in the domestic markets of the USA and Japan, it has not won a single contract.

If, as the Green Paper seems to suggest, the space segment domain became open to other, private satellite operators, EUTELSAT and national government operators would have to face competition and would naturally demand the freedom to procure their satellites from the cheapest sources. The European satellite markets, which until now have been protected against foreign intrusion, would be in great danger of being overwhelmed by US industry unless countermeasures are taken. The possibility that the very existence of European aerospace industry would be at stake is a matter of strategic importance for Europe and requires careful consideration by the Commission. Whether or not this state of affairs is accepted as an inevitable consequence of the Single Market, the question as to which role ESA should play in the future needs to be addressed.

The opening up of the market to global competition is bound to give US and Japanese suppliers an enormous advantage, unless some precautions are taken and a period of transition is implemented for European industry to prepare itself.

Indeed such companies as Hughes Network Systems (HNS) and ATT Tridom in the USA, and NEC in Japan have already supplied tens of thousands of VSAT stations both to their home markets and to other regions of the world, where satellite communications systems for business applications can be deployed without any of the regulatory constraints that characterise the European continent. By comparison, the European market is still in its infancy.

It is important to note that a key element in the success of a company such as HNS is the ability to offer a complete end-to-end package comprising all layers from satellite capacity to network hardware and software, and customised service to end users. The horizontal stratification of satellite communications which still prevails in Europe prevents this sort of approach.

Both industry and the Agency would need to investigate ways of adapting themselves to the new situation. ESA wishes to draw the Commission's attention to these important issues and would welcome the opportunity to discuss them in detail.

The Need for a Comprehensive R&D Policy

Telecommunications industries rely almost entirely on contracts from their national TO for their R&D work. In the specific case of satellite communications, ESA is also a source of funds. However, the role of the Agency is traditionally restricted to space technology. Since satellite communications is of marginal interest to the TOs, they naturally invest the bulk of their R&D resources in developing advanced terrestrial technology. As a result, an R&D vacuum exists in Europe, and this has given a clear advantage to non-European suppliers in the earth segment markets created by INTELSAT, INMARSAT and EUTELSAT.

Earth station technology has always been considered a minor adjunct to ESA's space programmes, and it is obvious that the very modest contribution made by the Agency in this domain has been totally inadequate. Moreover, as several respondents to the ESA survey pointed out, other important elements in the chain, namely network control software and application support, have so far been totally neglected. Since these are both costly and essential, they require special attention and deserve R&D support on a European scale.

ESA believes that a comprehensive and coherent R&D policy should be drafted as part of the overall policy proposed by the Commission. The objectives should be to ensure adequate R&D support to European industry in a vertically integrated fashion, due consideration being given to the views and requirements of all parties concerned. At present, R&D policy tends to be made at national level and based on the requirements of the TOs. Telecommunications R&D should not be the exclusive responsibility of the TOs. The roles of ESA and national organisations including TOs should be clearly redefined so as to create a coordinated R&D policy at European and national level.

The Development and Promotion of New Applications

One of ESA's missions is to study, develop and promote new applications of communications satellites. The OLYMPUS and ARTEMIS Programmes are largely dedicated to this mission. To achieve its objectives, ESA should logically become active in all layers and not solely in one. If this were the case, its activities would match those of industry; once it has restructured itself to achieve the vertical integration needed to compete with its non-European counterparts.

The TOs have never shown much interest in making use of ESA developments themselves (e.g. the PRODAT system). Moreover they have inhibited private entrepreneurs from turning them into commercial ventures. As a result, many promising activities have never reached the commercial objective that was aimed at. The Green Paper is welcomed because it will make it easier for private operators to take over and operate new systems. However, several respondents suggest that ESA's role should be extended so that it can carry out experiments

and demonstrations of new systems with a view to helping industry launch new commercial activities.

The Commission proposes as one of its major objectives the "full use of the technological potential of ESA, in order to develop satellite technologies further for both private and public applications". This statement certainly needs clarification and amplification. It is suggested that ESA and the Commission jointly examine how this objective could best be reached, to ensure that the Agency's role is made consistent with the overall objectives pursued by the CEC.

Licensing Schemes and Connections to Public Network

The Green Paper proposes to restrict the "special rights" of TOs to the strict minimum required for them to provide the basic services and, for all other services, to introduce licensing schemes which will guarantee the necessary safeguards in matters of radio-interference, security, etc. Many responses contain specific comments related to these proposals, but their diversity is such as to make a synthesis very difficult. It is believed that this difficulty stems from the lack of precision inherent in the proposals.

It should first be noted that the Green Paper places undue emphasis on satellite distribution networks that consist of one central hub station and indefinite number of peripheral microstations (VSATs), often assumed to be of the receive-only type. This happens to be the most common type of satellite network today, but is only one particular case. The most general case is the network involving any number of microstations, fixed and/or mobile, capable of transmitting and/or receiving. The star-shaped network is a subset in which the communications links exist exclusively between the peripheral stations and a central station acting as a hub. Further subsets of this family of networks are those networks in which the peripheral stations are receive-only (distribution) and those where the peripheral stations are transmit-only (data collection and satellite news gathering).

Proposals for licensing schemes should be made for the most general case; they would then automatically apply to all particular cases. Furthermore, it should be made clear whether the proposals are to introduce licensing schemes for single stations, or for complete networks, or for both.

On the other hand, the Green Paper does not make a clear distinction between the different functions for which the question of licensing arises. It can be seen that the setting up and operation of communications services by satellite involve the following activities:

- a. operation of a space segment (infrastructure)
- b. operation of a communications network using some capacity of the space segment (infrastructure)
- c. provision to end users of communications services supported by the network and the stations (services)

- d. operation of user stations giving access to the communications network (infrastructure)

It is obvious that these functions, which in the most general case could be performed by different entities, may require different licensing schemes. The problem is therefore more complex than it would appear at first sight.

The licensing of service providers is not addressed at all. Since the Single Market principles must apply to services as well as persons and goods, it is essential that any future instruments make specific provisions in this direction. This is particularly relevant to the provision of Europe-wide mobile services by satellite.

The main point of concern, however, is that the Green Paper suggests a "Community scheme concerning the mutual recognition of licences for satellite terminal networks". This scheme is not described further, but seems to imply that a licence to operate a Europe-wide network could be issued by a national authority and be recognised automatically by all others. Apart from the problem of multinational frequency coordination, which would not be trivial, it is difficult to imagine how such a scheme could work. Conflicts would arise inevitably between national authorities with different interests and policies. This kind of problem is anticipated by many respondents who advocate the creation of a European equivalent of FCC in the USA. ESA believes that any scheme involving the agreement of individual national authorities would give rise to long and discouraging procedures, which would be detrimental to the satellite communications business. It is therefore, essential to find a realistic and workable solution to this problem. It is recommended that the Commission should study in more detail how mutual recognition could be made to work in practice and some ESA member states suggest that it should consider whether a better solution would be the creation of an independent European authority whose jurisdiction would, of course, not be limited to the present European Community boundaries.

Another issue related to the same problem is that of making the licensing schemes conditional on whether the user station is or is not connected to the public network. Many respondents have pointed out that such a proposal is unrealistic and that this distinction should not be made. Indeed, in many cases, the stations will by necessity be connected to the terrestrial network, be it leased lines or the public switched network itself. Research done for ESA into user requirements shows that most companies interested in satellite-supported private networks already use private networks based on terrestrial infrastructure and would require the two types to be interconnected. Moreover, for technical reasons, it will be impossible to verify whether or not voice traffic is passed in an integrated digital environment, where voice, data and video signals will not be distinguishable from one another. ESA believes that the aim should be to allow connection to the public switched network with unrestricted access. Independent operators will suffer if

restrictions are imposed whereas the TOs exaggerate the economic harm to themselves that unrestricted access would cause. It is appreciated that removal of restrictions must be a gradual process but the eventual aim should be recognised. While restrictions are in force, they must not be allowed to bar access entirely: firstly because of the technical problem of defining what is meant by connection and, secondly, because small amounts of traffic into the public network is of no harm to the TOs.

The Need for Interim Measures

It appears from the above considerations that Europe is faced with two conflicting requirements. On the one hand, time is pressing and delay in implementing measures to create a favourable environment is likely to be detrimental to European interests. On the other hand, several players are clearly not prepared to face the consequences of a radical change in the rules of the game. ESA suggest that the Commission should, in cooperation with all parties concerned, including the Agency, initiate progressive measures to cover a transition period.

Clear Policy for Aiding Europe's Electronics Industry Seen Lacking

91WS0379A Duesseldorf VDI NACHRICHTEN
in German 3 May 91 p 3

[Article by Wolfgang Mock: "That's Not How the Game Is Played"]

[Text] The times are gone when the Federal Government was still worrying that "the competitive ability of the German information technology was endangered by the worldwide efforts in this field." In the mid-1980's it still wanted to do everything "in order to improve the competitive ability of the Federal Republic of Germany in the field of information technology," as it says in a draft paper from the spring of 1984.

Today, hardly anyone at the Federal Research Ministry (BMFT) wants to be reminded of these goals. According to Assistant Secretary Werner Gries, who is responsible for information technology at the BMFT, "such things can't be done nationwide any more. What use is it just to keep repeating the old heroic slogans?"

Increasingly more companies in the EC are now finding out that even massive government funds cannot prevent them from being forced to their knees by Japanese and U.S. competition—Philips had more than 4 billion gulden in losses last year, Thomson lost 2.7 billion francs in entertainment electronics alone, Bull had 6.8 billion francs in losses, and even Siemens-Nixdorf Information Systems was 380 million German marks [DM] in the red.

As late as last week Olivetti suspended dividend payments, a direct consequence of a profit collapse of nearly 70 percent last year. Seven thousand jobs are endangered.

Bull will now get a subsidy of 4 billion francs and Thomson 2 billion francs from the government coffers. And Leon Brittan, the foremost opponent of subsidies in the EC, will have a hard time preventing it: The state is the owner of the these companies, and an owner may pump as much money into his companies as he wants. Olivetti as well is negotiating for millions in government aid.

In the FRG such developments are followed attentively. Both France and Italy are heavily in debt, and "purely political pragmatism" (Gries) could tempt them to demand increased subsidies for their electronics crises from Brussels' pockets. If so, they would definitely acquire an opponent—Federal Research Minister Heinz Riesenhuber.

In the opinion of the Germany industry he is doing little to prevent the present misery in the European information and communications industry from overflowing into the FRG. The Information Technology 2000 concept passed in 1989 lacks the involvement of the 1980s, and the subsidies to industry have shrunk from almost DM500 million in 1987 to not quite DM300 million in 1990. Half of that is reserved for medium-sized companies, which hardly play any role in this competition. "More money is out of the question," says Gries categorically. "There's nothing doing, even if we wanted to."

If Gries is to be believed, the future of information technology in the FRG lies in turning the country into some sort of vast technology park, similar to the U.S. Berkeley, by means of improving research. About DM700 million now flow from the BMFT to research, and that sum will grow considerably by 1993. The advantage of this support, it says in a position paper by the research ministry, is furthermore that it is "competition neutral."

This is based on the philosophy to leave the German industry to itself and to the market forces as much as possible. This philosophy is now represented by European and international cooperations and takeovers. According to Gries, the market is only taken into account "when market-dominating enterprise mergers are created." And even here the individual state can no longer intervene, "but only a cartel authority of the United Nations itself. And that must also be armed with the authority to get tough."

From this point of view neither Gries nor Riesenhuber have any problems with the cooperation of the British company ICL, controlled by Fujitsu, in the European microelectronics research project Jessi. What is of decisive importance is whether international competition is expanded with such promotion and—when European subsidies are involved—whether this safeguards jobs in Europe.

Such unadulterated market-economic thinking not only brings down on the Federal Research Ministry the criticism of the industry, which in its own opinion suffers from unfair competition from Japan, but also that of

neutral observers. "That's not how the game is played," Edgar Grande of the Max-Planck Institute for Social Research in Cologne criticizes the gradual pullout of politics from the support of industry. "In dealing with strategic goods such as information technology there is no free market; that is always a political market."

The European Community also seems slowly to side with this conviction. Industrial policy is a new key word, and both EC commissioner Filippo Pandolfi, responsible for research, and his German colleague Martin Bangemann, responsible for industrial policy, and the president of the EC Commission, Jacques Delors, appear increasingly to like this concept. At the end of April they quietly met with representatives of Siemens, Philips, Olivetti, Bull and Thomson, in order jointly to seek ways to get out of the slump.

In a paper on the European information and electronics industry disseminated as early as the end of March, Bangemann reflected on whether the European Community ought not to contemplate the development of a second research and technology generation, "ranging from precompetition projects to projects close to the market, in order to keep up with the extremely fast pace of technological progress."

Such words are music to the ears of the FRG industry, to be sure, but programs with this orientation would only take effect after 1994, when the just passed third EC framework program for research and development runs out.

Furthermore, there are good reasons for the European industry to doubt the involvement of the EC Commission in market-close research. The commission wanted to make 25 percent, or precisely DM2 billion, available for its participation in the Jessi program. For the parts of the program now under way it has only put up a meager six percent, and at least in the FRG industry it is not anticipated that it will ever be more than eight percent.

But unless the EC becomes more actively involved, it will soon have to deal with much harsher demands. Thomson chief Alain Gomez recently demanded a protective European customs duty against Japanese information and communications imports for the next five years. The German enterprises are still clearly repudiating such demands. The question is for how much longer.

EC: Predominance of Major EUREKA Projects Criticized

91AN0455 Rijswijk POLYTECHNISCH WEEKBLAD
in Dutch 23 May 91 p 1

[Article by Bart Stam: "EC Members of Parliament Oppose Predominance of Large EUREKA [European Research Coordination Agency] Projects"]

[Text] Members of the European Parliament (MEPs) do not want large-scale projects such as the Joint European

Submicron Silicon Initiative (JESSI) and the high-definition television (HDTV) project to dominate the EUREKA program. They are completely at odds with Prof. Dr. W. Dekker's Assessment Panel. This panel will present its recommendations during the EUREKA Conference in The Hague on 18 June.

Although it is not explicitly mentioned in the final communique, the MEPs, gathering in The Hague, discussed the EUREKA strategic projects at length. According to the PvdA [Dutch Labor Party] MEP W.J. van Gelder, the MEPs do not want the JESSI, HDTV, or Prometheus (automobile electronics) projects to negatively affect smaller technological projects, whereas the Assessment Panel wants EUREKA to do more for these mammoth projects. "The MEPs' concern is quite logical," says Van Gelder, who is also president of the [Dutch] Standing Parliamentary Committee for Science Policy. "Countries like Portugal have almost nothing but small and a few medium-sized companies. They could miss locating foreign partners. Still it would be wrong to accommodate JESSI, HDTV, and Prometheus elsewhere." In their resolution, the MEPs call for more involvement of small- and medium-sized companies in EUREKA.

Coherence

Last week's meeting in The Hague was the second occasion for MEPs to discuss the EUREKA program. They first met in Rome in 1990. After two meetings, Van Gelder observes the MEPs' growing concern about EUREKA's ups and downs.

In their joint declaration, the MEPs called for greater coherence between the EC's overall Framework Program and EUREKA. Roughly, the EC Framework Program is chiefly aimed at precompetitive research, whereas EUREKA's goal is the manufacturing of commercial products. "Both initiatives match beautifully on paper, but in practice this is unfortunately not the case," says the Dutch MEP.

New Impetus

A second recommendation is that EUREKA should give extra technological impetus in the areas of infrastructure and the environment. According to Van Gelder, Western countries should involve East European institutes in EUREKA, especially in the area of environmental technology, with the emphasis being on prevention, the development of clean and process-integrated techniques, and the protection of architectural buildings. This proposal was made by Italy and Turkey. For that matter, the PvdA MEP thinks it is too soon for a massive entry of East European countries into EUREKA: "Time is not ripe yet. Nevertheless, these countries should be given a chance to become members of EUREKA in due time. That is why we have to start the preparations," he adds.

NOTA

But not only small- and medium-sized companies and East Europe should become more involved in EUREKA. The MEPs also want social groups to have a say in EUREKA. Hence their plea to submit all projects to a technological aspects study, which critically looks into the advantages and disadvantages of such projects for society. Van Gelder thinks that the Dutch Organization for Technological Aspects Study (NOTA) could perform this task in the Netherlands. Germany, France, and the Scandinavian countries also have similar institutes. "We should get society much more involved with EUREKA, but a large-scale awareness campaign is needed to do so," he says. He also thinks that it is the regional governments' responsibility to stimulate companies to participate in international research programs.

EUREKA Conference Approves East European Participation, HDTV Standard HD-MAC

91WS0418A Paris AFP SCIENCES in French
20 Jun 91 pp 1, 2

[Text] La Haye—It was not possible for Western and technological Europe to ignore the upheavals in East Europe much longer. EUREKA's [European Research Coordination Agency] fifth birthday party on 18 June in La Haye provided the opportunity to officially appeal to the "other Europe" to take part in the adventure.

The appeal, which is as much political as technical, was made by President Francois Mitterand, who sees EUREKA as "an essential element in building Europe." EUREKA's "father", who claims no special paternal instinct or authorship rights, pointed out that EUREKA had been dreamed up "before 1989, even before 1990." "Since then, a great revolution has begun," he reminded his audience during a ceremony copresided by Queen Beatrice of the Netherlands, the Finnish president Mauno Koivisto, and the Dutch prime minister Ruud Lubbers.

The ceremony was a prelude to the annual ministerial conference that would bring to an end Holland's term as president of EUREKA the following day (Finland takes over). It became clear in the course of it that the originators of the ambitious European project were themselves occasionally amazed at the progress that has been made since the program was christened in April 1985.

For the French president, "EUREKA is one of" Europe's "surest successes." "We built it without imagining that it would be possible so quickly, to conceive an organization for Europe. Nothing is off limits to anyone (...) Let companies enter into contracts that will reunite, from one capital to another, what we call the European continent," he continued.

Like the German chancellor Helmut Kohl (who did not attend but whose message was read) or the Finnish president, the Dutch prime minister Lubbers also

stressed in his speech the remarkably rapid emergence of a flexible structure, characterized by a "bottom up" sense of initiative and collective responsibility—in sum, very European.

As the Europe of Twelve prepares to establish its Great Market, rethinks its relations with East Europe, and, most important, plans to clinch two essential treaties on Political and Economic and Monetary union in December, the speakers made a visible effort to hold up this European collaborative initiative as an example.

During the annual interministerial conference the following day, the 19 EUREKA member countries adopted 121 new projects (35 concerning the environment), bringing the number of EUREKA projects to 470. The budget for the projects is rising from 7.4 to 8.2 billion European currency units [ECU]. During Holland's presidency, the number of companies, research centers, and universities also grew sharply, climbing from 2,300 to 2,773.

It was not an exercise in "shameless flattery" explains a high-ranking government employee of a delegation. For not everything in EUREKA is rosy, and the "Five Years of EUREKA" report, which the conference examined, pointed up many weaknesses and faults that need correction.

The final communique, while expressing satisfaction with the overall "staying power" of the EUREKA initiative, draws on the report to indicate several general directions to follow. They include higher quality projects, increased participation by small and medium companies, more open procedures for obtaining the "EUREKA label", synchronized funding of multinational projects, and closer collaboration between EUREKA and the EC.

All are measures aimed at buttressing the "strategic dimension" and at "sticking" as closely as possible to the EUREKA program's great underlying principle: that research projects should produce concrete results, i.e., commercial applications that will enable European technology not only to hold on to but acquire market shares.

The desire to "tighten up" EUREKA's goals is clear when it comes to the very important JESSI project on electronic components. The latter has been frustrated at many turns, notably by the withdrawals (from certain subprojects) of Philips and ICL Company (as a result of Fujitsu's acquisition of a majority stake in it). The European research commissioner Mr. Filippo Maria Pandolfi insisted on the need to give JESSI "a greater strategic focus." "We have done a nice job of taking inventory, now we must define the essential points," said the French minister of research, Mr. Hubert Curien, to the AFP [FRENCH PRESS AGENCY]. JESSI should begin its primary phase on 1 January, 1992.

The effort at rationalization that is afoot was best illustrated in La Haye by the agreement that was reached on the European HDTV [high-definition television]

broadcast and production standard. For the first time the 19 countries formally came out in favor of a "single European standard", the HD MAC [High-Definition Multiplexed Analog Component]. "It is the main result of this conference," according to Mr. Curien.

Finland, which assumed the presidency of EUREKA for one year, will have to strive to implement all the resolutions of the "La Haye Declaration", and especially to establish concrete bridges for collaboration with East Europe. In any case, EUREKA must not waste time. Although optimistic, Mr. Wisse Dekker, president of Philips's monitoring committee and of the experts' group, nonetheless issued a warning before Mr. Mitterrand: "We are moving quickly, but others, notably in southeast Asia, could move more quickly than we do." The next ministerial conference will be held in May 1992 in Tampere (Finland).

Eureka's Five-Year Anniversary: Successes, Failures Reported

Projects Reviewed

91WS0423A Paris LE MONDE in French 19 Jun 91
p 21

[Article by Annie Kahn: "Eureka Has Aided More than 500 Projects"]

[Text] Mr. Francois Mitterrand for France, Queen Beatrix and Prime Minister Lubbers for the Netherlands, and President Koivisto for Finland attended a conference on Tuesday 18 June at The Hague to celebrate the fifth anniversary of Eureka. Finland now assumes the presidency of this European research program, replacing the Netherlands; the baton will be passed to France in June 1992. The conference gave the Eureka imprimatur to 120 new projects, including 28 with French participation.

"It is time we kept Europe's brains in Europe, and to do so we need to offer them sufficient scope for their research and creativity." These words, spoken by Mr. Francois Mitterrand at the June 1982 summit of industrialized nations at Versailles, were the genesis of Eureka. This European research program, which France proposed formally in June 1985 (though it only became operational a year later), was a response to the American "star wars" project, the SDI (Strategic Defense Initiative).

Five years later, all sides hailed its success and originality, both in terms of the number of participants, within and beyond the borders of the European community¹, and in terms of its accomplishments. Unlike European Community programs established by the Commission for a specific sector (such as Esprit in computer research), Eureka's projects are chosen by research teams in all domains, with considerable emphasis on economic functionality.

Large Investment

Of course, several big projects, such as JESSI [Joint European Silicon Semiconductor Initiative] in the area of electronic components, the HDTV (high-definition television) project, and Prometheus in the automobile sector, tend to monopolize everyone's attention and a goodly share of each year's budget (26.5 billion French francs [Fr] over nine years for JESSI, Fr5.2 billion over seven years for HDTV, and close to Fr4 billion over nine years for Prometheus). Nevertheless, by the conclusion of the meeting at The Hague, a total of more than 500 projects had received Eureka designation. They represent an investment of more than Fr80 billion, about 30 percent of which is provided by public authorities.

At the request of the Dutch, a panel of seven experts that included one Frenchman—Mr. Philippe Desmarescaux, president of the agrochemical branch of the Rhone-Poulenc group—evaluated Eureka's progress to date, giving the program high marks overall. "Eureka has contributed to strengthening the competitiveness of European firms by stimulating cooperation in research and development, accelerating the introduction of new technologies, and creating new business opportunities."

The report confirms the utility of a research approach that builds "from the ground up, in a decentralized, basically unbureaucratic way." It has enabled small enterprises to get Eureka designation: In 1990, 27 percent of the designated enterprises were PMI's [small and medium-sized enterprises]. But that is not enough, the report concludes, owing to inadequate information, the lack of assistance for research partners, and insufficient financial aids for project design and feasibility study preparation. France raised all these points a year ago, in relation to its own nationals, in an evaluation that led to financial assistance and a simplification of procedures for PMI's.

Serious Criticisms

The new report discreetly ignores the difficulties various projects have encountered, such as Philips' withdrawal from the JESSI electronics components project, which leaves several JESSI subprojects in the lurch, and the problems posed when a non-European firm takes over a company participating in one of the projects (ICL, for example, which is now 80-percent owned by Fujitsu).

However, the report does contain some criticisms, the strongest of which have to do with the absence of strategic projects, the lack of quality control, problems with procedures, and inadequate linkage between Eureka and the European Community. While insisting that Eureka and Community research programs should remain distinct, the report proposes establishment of linkages between them so as to "facilitate access to the Community research market." Without compromising the "ground-up" approach, which encourages industrial initiative, it calls for more involvement by governments "to encourage industries to come up with strategic projects."

A criticism understood by Mr. Mitterrand, who in his speech said he thought Eureka should focus on four areas: information technology (specifically medical applications, the language industry, i.e., computer-assisted translation software, document searching, etc.); automotive technology, for the development of cleaner, safer, and more convenient vehicles; future manufacturing technology; and environmental industries.

Unconsummated Marriages

With great pomp, the Eureka research program celebrated its fifth anniversary on Tuesday. Since its inception, this "matrimonial agency" as it is called by Jean-Baptiste de Boissiere and Bertrand Warusfel in their book "La Nouvelle Frontiere de la Technologie Europeene" [The New Frontier of European Technology], has been responsible for more than 500 research-team "marriages." But it is fair at this point to ask what all these liaisons have produced. For though Brussels may give its blessing to alliances between research teams, it sings a different tune when the time comes to move on to industrial applications. And the few cases where the Commission—instead of moving to stop allegedly nefarious "abuses of dominant position"—actually approves such link-ups, have involved enterprises that required a good deal of prodding, since their preference was to conclude alliances where they best saw fit, without limiting themselves to Europe.

Examples abound. In the components domain, the JESSI project continues to limp along, despite the withdrawal of Philips, but all the players hang back in their own corner when asked to create a joint-venture company to save this imperiled sector. Apart from Thomson, which would have much to gain from such an alliance, Siemens prefers to make common cause with America's IBM, while Philips doubtless has its own worries. In the automobile industry, it is true that Peugeot and Renault are collaborating in the Prometheus program, but for how long? Renault's alliance with Mitsubishi, via Volvo, has put a distinct chill in relations between the two French auto builders.

On the other hand, a great deal of patience is being demanded of certain manufacturers attempting to obtain Brussels' approval for creation of joint subsidiaries. Alcatel and Fiat, for example, had to wait months for permission to consummate their cooperation agreements in the fields of telecommunications and batteries, and approval was not granted without offsets.

True, "industrial policy" is no longer a forbidden term in the Community vocabulary. And the winds of change have even been felt within Eureka, whose most recent report calls for implementation of more strategic projects at governmental prompting. But the inconsistency between the movement toward research cooperation and centrifugal forces blocking such cooperation at the industrial level is still flagrant. It would be a pity if Eureka's marriages are never consummated.

Footnote

1. Nineteen European countries participate in Eureka. In addition to the 12 countries of the Community, participants include Sweden, Austria, Switzerland, Norway, Finland, Iceland, and Turkey.

R&D Commercialization

91WS0423B Paris LE MONDE in French 18 Jun 91 p 10

[Article by Sophie Seroussi: "First Commercial Benefits for Eureka, Europe's 'Gifted Child'": first paragraph is LE MONDE introduction]

[Text] The only clouds on the horizon: continued lack of political consensus on JESSI and HDTV...

Eureka! Archimedes would not have been embarrassed to be associated with the ambitious program of that name designed to build European technology. Five years after its inception, European researchers and manufacturers are exclaiming with one voice: "We have found it!" A miraculous formula? Not really. The technological beatings the industrialists have taken from the Japanese rise to power are clear evidence of that. No, a different kind of formula, one adapted to industrial realities and based on a French initiative. "It's been successful because it depends on industrial initiative," says Henri Guillaume, secretary general of the program. "More than anything else, what private companies appreciate is the supple, flexible framework Eureka provides for their technological cooperation plans."

That fact will be demonstrated today at The Hague, where Francois Mitterrand is attending the lavish ceremony to celebrate the fifth anniversary of the program. Following the report prepared last year in France, a team of European experts headed by Professor Wisse Dekker of Philips has prepared a new and highly positive assessment of the program: 58 percent of the participating enterprises questioned say "the program has contributed to strengthening their position in Europe," and more than half have established durable ties with a foreign partner. By the end of this eighth [as published] meeting, the number of designated projects will have topped the 500 mark, and those projects will entail contributions from 2,000 companies representing some thirty different countries. The total investment in "high-tech" sectors: 80 billion French francs [Fr].

"By encouraging closer cooperation between the different countries, Eureka has tried to augment industrial productivity and competitiveness and support the diverse European national economies on the European scene," explains one high-level official. Mission accomplished. The first commercial outgrowths are beginning to hit the market (see below). During its 1992 presidency, France firmly intends to conduct a preliminary evaluation of these economic spinoffs, thus continuing to assert its leadership. But it's not all roses. For example, manufacturers and researchers questioned

pointed out there is no synchronization of the public funding various countries provide.

Another problem: the awkwardness of cohabitation within the JESSI and HDTV projects, however prestigious they may be. "The technical and political difficulties these programs have encountered are not of Eureka's making," fumes an indignant Guillaume. "And if Eureka had not come to HDTV's support, we would have a Japanese HDTV standard today!" Mindful of this fact, Eureka teams from all the European countries will try at The Hague to achieve a greater degree of consensus on JESSI and HDTV. "The semiconductor program would do better if it were rationalized," one specialist believes. "As for HDTV, it is absolutely essential to agree on the modalities for introduction of the D2-MAC broadcasting standard." The Dutch presidency had the misfortune to coincide with a period of grave crisis for multinational Philips, a major partner in both projects.

Productive Fallout

The following Eureka projects have already found market applications:

- Upac, a textile industry project, has led to the sale of CAD/CAM [computer-assisted design and manufacture software] systems. Cumulative turnover for 1988-1990: Fr88 million. French partner is Lectra Systems.
- Sinapse, doing research on equipment for the manufacture of electronic cards, has led to systems commercialization. Cumulative turnover for 1988-1990: Fr44 million. French partners are Eurosoft and Sagem.
- Fiabex, a project relating to industrialization of software and expert systems in the field of industrial systems operating safety, has led to creation of a marketing club and systems sales in 1991. French partner is CEP System.
- GTO, a project focusing on power packs (thyristors) for locomotion, has led to European independence [in this domain], with the creation of two production facilities (one of them in France). French partner is ST.
- ES2, whose research has to do with design and manufacture of integrated circuits on demand, has led to creation of a production center in France. Cumulative turnover for 1987-1990: Fr33 million. French partner is ES2.
- Eprom, a project relating to four- and eight-megabit memory chips, has led to qualification and commercialization this year of four-megabit memories, continuation of the project in the JESSI framework, and a linkup of SGS and Thomson, which merged. French partner is ST.

- Tribune, an Ada-language software development project, led to product commercialization in 1989. The Fr27 million turnover covered R&D costs. French partner is Alslys.
- Amadeus, a computerized transportation network management system, went from subsystems validation to the creation of European centers, including one in France, and was put into service in 1991. French partner is Air France.
- BDII, a database management systems project, has led to formation of a joint production subsidiary and the launching of product commercialization in 1991. French partner is IN2.
- MIP, or modular imaging process, is expected to lead to commercialized systems by 1993. French partner is TRT.
- Phototronics, a project relating to applications of noncrystalline silicon, has led to creation of a production facility in France, reutilization of coating machinery for the manufacture of flat screens, and product commercialization in 1991. French partner is Solems.
- Carminat, devoted to on-board automobile navigational assistance systems, has led to development of a range of products and to demonstrations in 1990-1991, with equipment expected to be commercialized in 1993. French partners are Renault and Sagem TDF.

HDTV Standard HD-MAC Adopted

91WS0423C Paris LE MONDE in French 20 Jun 91
p 14

[Article by Sophie Seroussi: "Nineteen European Nations Adopt HD-MAC [High-Definition Multiplexed Analog Component] as Television Standard of the Future"; first paragraph is LE MONDE introduction]

[Text] Nineteen countries—not just the six that were already on board—have now adopted HD-MAC as the HDTV [high-definition television] standard. A compromise resolution that should satisfy the manufacturers concerned...

The Hague—A concrete step forward for the Ninth Eureka Conference at The Hague: The 19 countries involved in the European technology program agreed to make HD-MAC the definitive HDTV standard. Though HDTV had been on the agenda of four previous ministerial conferences, this was the first time a joint statement on the subject was signed. And Filippo-Maria Pandolfi, vice president of the European Commission, made a formal statement promising EEC support for the MAC standards family.

Previously, the only countries committed to MAC were the six involved in the EU95 program to develop HDTV technologies—France, Germany, Great Britain, Italy, Netherlands, and Finland.

"This is a decisive step for the introduction of HDTV in Europe," exclaimed Hubert Curien, France's minister of research, after the conference, though he himself admitted the text could have been "stronger." Though all the countries agreed to work together on HDTV based on a single standard and common regulations, some insisted on the need for more time to make the transition. The compromise language did not clearly resolve the thorny question of transition via the intermediate D2-MAC standard.

Luxembourg and several other European countries are not willing to see D2-MAC imposed as the sole transition standard for European HDTV. "If they had specified D2-MAC, they would have had to go on without us," said one Luxembourg delegate. It seems, however, that the "compromise of The Hague," while it fell short of resolving everything, will have the virtue of being more to the liking of the European Commission, which soon must adopt a directive on broadcasting standards.

Filippo-Maria Pandolfi is supposed to meet again next week with the manufacturers concerned. "At any rate," the French delegation insists, "once the countries agreed on the 16X9 format, D2-MAC was implied."

All the same, the text spells out neither the intermediate steps nor the calendar for implementation of the definitive standard. An artistic "fuzziness," carefully preserved in order not to ruffle anyone's feelings, but one which could mean a great deal more lost time as the moment of truth for industry approaches.

A similar ambiguity surrounds the JESSI [Joint European Submicron Silicon Initiative] semiconductor program. Eureka's member countries agreed on its usefulness and on the need to concentrate on a certain number of programs... but without any more specifics on priority areas or financing modes. The 200 or so subprojects that have been identified in the JESSI framework are going to have to be pared back to about fifty.

Apart from the stormy debate over Eureka's two flagship programs, this ninth conference was also marked by the promulgation of new rules to allow countries of Central and East Europe to become full members of the European technology club. Out of Eureka's [European Research Coordination Agency] current list of 470 projects, 120 of which were adopted at this meeting, nine already involve the USSR, Hungary, and Yugoslavia.

Five-Year Evaluation Report Gives EUREKA Mixed Reviews

91WS0409A Paris LE MONDE in French 19 Jun 91 p 21

[Article by Annie Kahn: "EUREKA Has Assisted Over 500 Projects"; first paragraph is LE MONDE introduction]

[Text] France's Francois Mitterand, the Netherlands' Queen Beatrix and Prime Minister Lubbers, and

Finland's President Koivisto attended the conference celebrating the fifth birthday of EUREKA [European Research Coordinating Agency] in The Hague on Tuesday, 18 June. Finland will take over the presidency of this European research program from the Netherlands before passing the baton on to France in June 1992. In the course of the proceedings, Eureka will give its label to 120 new projects, including 28 with French participation.

"It may be time to keep the brains of Europe in Europe and, therefore, to provide them with sufficient scope for their research and expressive capacities." Spoken by Francois Mitterand in June 1982 during the summit of the industrialized countries in Versailles, these words were to give rise to EUREKA. This European research program, officially proposed by France in June 1985 but only truly operational a year later, constituted the response to the American SDI (Strategic Defense Initiative) "Star Wars" project.

Five years later, it is universally hailed for its success and originality with respect both to the number of its participants, which go beyond the borders of the Community,¹ and to its approach. Unlike Community programs, which are defined by the Commission for a specific sector (for example, ESPRIT [European Strategic Programs for Research and Development in Information Technology], for research in the field of information systems), EUREKA projects are defined by research teams from all fields, and great importance is placed on the economic objective.

80 Billion Francs Invested

Certainly, a few major projects like JESSI [Joint European Submicron Silicon] for electronic components, the HDTV [high-definition television] project for high-definition television, or Prometheus for automobiles often monopolize attention and a good portion of the allocations (26.5 billion French francs [Fr] over nine years for JESSI, Fr5.2 billion over seven years for HDTV, and almost Fr4 billion over nine years for Prometheus). Nevertheless, at the close of the meeting in The Hague, a total of more than 500 projects will have received the EUREKA label. This represents an investment of more than Fr80 million, around 30 percent of which is publicly funded.

The audit conducted at the request of the Netherlands by a panel of seven experts (including one Frenchman, Philippe Desmarestaux, president of the agrochemical branch of the Rhone-Poulenc group) gives the program good marks over all. "EUREKA has helped to strengthen the competitiveness of European firms by stimulating cooperation in research and development, accelerating the introduction of new technologies, and creating business opportunities."

The report confirms the advantage of the program's "bottom-to-top, decentralized, and largely unbureaucratic" field approach, one which has made it possible for small companies to receive the EUREKA label. In 1990, small and mid-sized manufacturers accounted for 27 percent of EUREKA projects. However, the report concludes that this score is still not high enough owing to a lack of sufficient information, of assistance in seeking partners, and of financial aid in defining the project and carrying out the feasibility studies. These are points previously mentioned in an audit conducted a year ago by France for French firms, which has resulted in financial assistance and simplified procedures for small and mid-sized manufacturers.

Major Criticisms

The report maintains a discreet silence on projects with problems. These include JESSI, the electronic components project, of which a portion of the subprograms has been hurt by Philips' pullout, and the difficulties posed by the takeover of a company involved in the project by a non-European firm (with the example of ICL, now 80-percent-owned by Fujitsu).

However, the report does contain criticisms. The major ones revolve around the lack of strategic projects, the lack of quality control, procedural problems, and insufficient ties between EUREKA and the European Community. While emphasizing that Community and EUREKA research programs should remain separate, it proposes establishing ties between them in order to "facilitate access to the Community research market." Without calling into question the "bottom-to-top" approach, which favors industrial initiatives, it recommends greater government participation, "in order to encourage manufacturers to define strategic projects."

Mr. Mitterand has taken this point to heart. In his speech, he specified the four topics he believes EUREKA should stress: information science (more specifically, medical applications and the language industry, e.g., computer-assisted translation and information retrieval programs); automobiles, for the development of cleaner, safer, more "user-friendly" cars; the factory of the future; and the environmental industries.

Footnote

1. Nineteen European countries are participating in EUREKA. In addition to the 12 Community countries, they include Sweden, Austria, Switzerland, Norway, Finland, Iceland, and Turkey.

ES2 Chairman Predicts Information Technology Industry Decline

91AN0450 Amsterdam COMPUTABLE in Dutch
24 May 91 pp 12, 13

[Article: "ES2 Chairman: Current Support Projects Are Waste of Money; European IC Industry To Founder Within Five Years"]

[Text] The European semiconductor industry will founder within five years, unless a very extensive support program is begun soon. The decline of the chip industry inevitably causes serious problems for all branches of the information technology industry. Some parts of this branch of the industry will not make it to the end of the century.

This harsh warning was given by Robert R. Heikes, cofounder and director of European Silicon Structures (ES2), a manufacturer of application-specific integrated circuits (ASICs) with branches in Munich (Germany), Roussel (France), and Bracknell (UK). Previously, he was European director of National Semiconductor and manager of Motorola. Heikes is trying to convince influential industrial leaders and politicians that the European IT [information technology] industry is on the verge of disaster.

His prediction that, unless an extremely costly emergency operation is launched, Europe will become a colony of Japan, is not a possible scenario but harsh reality, according to Heikes. Heikes calls it a near-certainty that Europe will become Japan's economic vassal, unless immediate action is taken. Only the EC has the power to turn the tide. In order to keep one single healthy manufacturer in each IT sector, no less than \$100 billion in aid will be needed over 10 years. Thus, there will only be room for one HDTV manufacturer and one portable phone manufacturer.

Some \$10 billion in aid per year can turn the IT industry into a viable industry with a turnover of \$400 to \$500 billion by the end of the century. Since the companies concerned do not have sufficient funds, this sum will have to be paid by the European tax payer. It is imperative that the policy makers realize that such extensive investment is necessary. Smaller amounts may just as well not be spent as they will only be wasted.

According to Heikes, it should be fully understood that Europe cannot survive in a part of the IT market for the simple reason that there are no parts: They are all interdependent. The various sectors of the IT industry constitute an indivisible entity. Moreover, the semiconductor industry is the "cement" that holds together the IT sectors. Without an independent European chip manufacturer, in Heikes' view, we can forget about the rest. In order to keep one healthy chip manufacturer, \$10 billion in aid is required. Siemens and SGS-Thomson have no other option but to pool their chip activities, reorganize thoroughly, and invest considerable amounts in research and development.

If we become dependent on Japan for the supply of chips, the prices will be set by that country. Heikes thinks that Japan will only supply chips at its convenience. This implies that Japanese industry will always maintain a lead and Europe will only exist by the grace of Japan. As an example, Heikes referred to ICL, which was literally bestowed upon Fujitsu. He thinks that ICL made the mistake of becoming dependent on Japan for

the development and supply of chips and having acquired a manufacturing license from Fujitsu. When the costs of the components procured from Japan became so high that ICL's profits were at stake, the British company had no option but total surrender to its Japanese partner.

ICL's fate will also hit other European manufacturers if they make themselves dependent on Japanese supplies, whether their area is consumer electronics, electronics for automobile industry applications, or telecommunications. Heikes is very skeptical about European support programs such as the European Strategic Program for Research in Information Technologies (ESPRIT), the Joint European Submicron Silicon Initiative (JESSI), and EUREKA [European Research Coordination Agency]. "It's nothing but peanuts," he says. He believes it makes absolutely no sense to distribute so little money over so many projects of so many companies and institutes. Moreover, these projects get stuck in bureaucracy. Because subsidizing authorities are more inspired by political motives than by economic considerations, the money goes to the wrong places. Despite all good intentions, these projects are a waste of money.

Heikes makes a comparison with charity actions. Only a fraction of the funds raised eventually reaches the destitute. An enormous amount of money is wasted on paperwork and travel expenses. Says Heikes: "Nobody will dare to confirm it officially, but everybody realizes that JESSI is not an efficient way to support the semiconductor industry. Too many companies and too many institutes are involved."

[Box, p 12]

Japan Versus Europe

Amsterdam—Japan has taken the lead in almost all major "technologies for the future." This applies to chips, optoelectronics, flat screen technologies, fiber optics, and micromanufacturing (fitting many components into a tiny box).

These conclusions appear in a report entitled "Europe: Colony of Japan or Member of the Triad," written by the American Robert Heikes. Japan has been able to take the lead via a judicious long-term strategy. Japan is the world leader in the abovementioned five areas. In addition, Europe does not have a convincing program in any of these future areas to enable it to catch up with the Japanese. Furthermore, the report states that Japan is becoming the leader in all consumer electronics growth markets. In the case of high-definition television (HDTV), it controls all the technologies required for its production, e.g., chips, screen technology, and optoelectronics.

In the area of computers, Europe is already a colony of Japan and the United States, according to Heikes. European manufacturers cover only one-quarter of the European computer market. Although they control about 16 percent of the world market, a considerable portion

consists of reselling Japanese or U.S. products. Japan's advantage is that it is second to none in its home market, which happens to be the fastest growing one. Moreover, many prominent European manufacturers use Japanese licenses or resell Japanese machines. Bull is to a considerable extent a sales and service organization of NEC mainframes. Olivetti sells Hitachi computers, and Siemens sells Fujitsu machines. The workstation market is controlled by the United States, but Japan is moving up. The Japanese dominate the laptop and electronic notebook market and they are also first in peripherals such as printers and photocopiers. Americans still dominate the software market, but the Japanese are not sitting idle. The Europeans have a lot of expertise in this area but they do not sufficiently put it to use.

In the future, Europe should become stronger in screens, chips, software, network technology, and micromanufacturing, if it wants to have some success in notebook and laptop computers. The arrival of HDTV, broadband communications, and mobile communication networks offers new possibilities in the area of computers. Europe has opportunities with the "systems integrators," i.e., companies which are contracted by a client for the supply and maintenance of a complete computer system. They buy the hardware and software and write their own software for the final integration. Heikes further recommends a move to the workstation market via HDTV technology. Although the United States is leading in the area of workstations, Europe has a lead over the United States in HDTV.

France: INIST, INRIA R&D Centers Open

91WS0422A Paris LE MONDE in French 4 Jul 91 p 12

[Article by Bernard Maillard: "Two Research Institutes Inaugurated in Nancy"; first paragraph is LE MONDE introduction]

[Text] The minister of research and technology Mr. Hubert Curien inaugurated two new research institutes 1 July in Nancy (Meurthe-et-Moselle): the CNRS's (National Center for Scientific Research) National Institute of Scientific and Technical Information (INIST) and a decentralized laboratory of the National Institute for Research on Data Processing and Automation (INRIA).

The establishment in Lorraine of two research institutes has less to do with the region's own desire than with a political choice made in 1984 by the then prime minister, Laurent Fabius, to compensate for the effects of the steelmaking slump. It was this decision that enabled Mr. Hubert Curien, minister of research and technology, to describe Nancy as occupying "a central position in the big scientific and research networks" during the inauguration of the two units.

The INIST, which arose from an initial desire to decentralise the CDST (the CNRS's Center for Scientific and Technical Documentation) and merge it with the CDSH (Center for Human Sciences Documentation), aims to rival the world's largest scientific libraries. Indeed, it

should be the only European central of that type to combine the collection of documentary materials with the supply of "primary" documents and the production of the bibliographic data bases dubbed Pascal (8 million scientific and technical references) and Francis (1.3 million references in human sciences).

Moreover, the institute, which has been allocated 400 million French francs [Fr]—Fr20 million of which will be paid by local collectivities—could become one of the components of the "very large library" desired by President Mitterand. This hypothesis is supported by several recent visits from Mr. Dominique Jamet, responsible for setting up the library, to the mayor of Nancy Mr. Andre Rossinot.

A New Regional Hub

INRIA's Lorraine research unit, which was the second institute inaugurated by Mr. Curien, is located in the Nancy-Brabois technological hub and has a satellite in Metz. A partnership agreement between INRIA, the CNRS, and the Lorraine universities, as well as a consultation committee christened LORIA, were established when it was created. Seven science projects have already been developed as part of four research programs on the subjects of symbolic computation, artificial intelligence, automation and automated production, and scientific computation.

After one year of existence, INRIA has gained recognition as an essential partner in the Lorraine scientific community. Furthermore, the region's collectivities were significantly more involved in founding INRIA than they were in creating INIST. In particular, they funded 40 percent of the building, whose area will more than double in the next one or two years. The joint projects of INRIA, the local universities, and the CNRS have spawned an "IAE + M" (data processing, automation, electronics, and mathematics) hub that should constitute the backbone of the "White Book for Lorraine."

France: ANVAR's Role in Innovation Discussed

ANVAR as Partner

91AN0447A Paris *COURRIER ANVAR (ANVAR MAGAZINE supplement)* in French Apr 91 pp 4-10

[Article by Sophie Brocas: "ANVAR: A Regional and European Foothold"]

[Text] The National Agency for the Implementation of Research (ANVAR) is not a technological registrar's office whose activities are limited to recording the latest developments in innovation. On the contrary, the 350 employees of the agency, spread over 24 regional groups, have learned over time to work in the field with companies. Over 15,000 companies know this already.

Nor is ANVAR a technology bank or an automatic distributor of subsidies. The proof is that over 11 years, more than 10 billion French francs (Fr) were allocated,

essentially in the form of loans that are reimbursable in case of success, thus enabling the agency to share with companies the risks of their innovation projects. And yet, ANVAR is no "omnivore" of high technologies. The presentation of a strong research and development team is not sufficient to seduce the agency.

The truth is that ANVAR has only one slogan: Accompany all small- and medium-sized companies and industries along their innovative road, because innovation today is just as sensitive an indicator as investment. Proof? Yes, nearby, in Germany, where there are twice as many researchers per 1,000 employees than in France. Our neighbors thus consider innovation as a vital raw material. Rightly so, when you look at their good economic health. Why?

Accelerated Dissemination of Technologies

"Quite simply because our companies integrate innovation faster than in the past," explains Omar Senhaji, ANVAR's secretary general. "Even more so since markets are more open to new ideas from abroad through the means of communication and the elimination of borders. In order to preserve their market shares and conquer new ones, companies must constantly offer products with greater technological content than those of the competition."

OK, but does this reasoning not apply only to high-technology sectors such as computers or electronics?

"Not at all," replies Jean-Remi Gouze, ANVAR's assistant director general. "No field is spared by this innovative drive. Nowadays, technology permeates all kinds of activities, even the most traditional ones."

However, innovation is a word which can still frighten.

"That's true," admits Jean-Yves Renaud, regional representative in Lorraine, "but the small- and medium-sized companies must understand that our definition of innovation is not restricted to high technologies. Innovation can also involve the adaptation of very well-known techniques."

"For example, in Lorraine, we supported Noremat, a company which adapted conventional technologies of agricultural machines to new requirements and came up with an entirely new product: a brush cutter for road embankments."

[Box, p 4]

Traditional Companies

In 1990, 40 percent of ANVAR's regional assistance covered traditional activities (wood, mechanics, etc.). Fr50 million were allocated just to the fields of textile, clothing, and leather. [End of Box]

A Partner for All Companies

But frankly, is ANVAR accessible to all companies without exception? Is it not just a lot of hot air to present itself as a partner of small- and medium-sized companies? Let's study the record.

Traditional companies, for instance, cannot escape the innovative process. "There is the 'Confiserie de Champagne,' which developed a machine for stoning dates for Christmas candy," explains Jean-Pierre Quinton, regional representative in the Champagne-Ardenne area, "or 'Textile Saint-Die,' which found a different process to weave cotton fibers, thereby increasing the fabric's elasticity to a degree unsuspected so far, which enabled it to make inroads in the medical fabrics market."

Gilbert Santini, regional representative for Haute-Normandie, states: "In my region, Delamare—a family company founded in the 17th century—managed to modernize its production to a point where the company became a leader in the market of high-end packaging." Which had to be proved: For ANVAR, raising the technological level of a traditional small- and medium-sized company is a matter of risk sharing. Can very young companies also call on ANVAR? Yes, definitely yes. First, the agency supports projects of small- and medium-sized companies that are less than three years old from the moment that they blend new technologies with commercial opportunities. Second, ANVAR offers them specific support: First, it provides a subsidy to define the corporate strategy; subsequently, it supports the innovation project which will enable the company to develop the new product.

"Look at Prosyst, a company created in Valenciennes in 1986," explains Francois Billon, regional representative in the Nord-Pas-de-Calais area. "First step: ANVAR granted aid to Valenciennes University for developing an error diagnostics card for programmable robots. Several laboratory members then decided to create Prosyst for industrializing the system. Second step: ANVAR supplied the young company with the funds to define its business plan. Third step: ANVAR assisted Prosyst in the final development and industrial and commercial launch of the new product." And medium-sized companies? They are also welcome at ANVAR. If they preserve their flexibility, they are also able to be successful. If they claim to have an R&D policy, they are also able to allocate the necessary funds to that policy. The medium-sized companies thus have all the qualities for playing their role as economic locomotive, somewhat like the German "Mittelstand." ANVAR is willing to support all those who decide to undertake programs of national or international scope. Alain Teissier, regional representative in Midi-Pyrenees, says that "Pierre Fabre Medicament is a typical example. With its 1,892 salaried employees, this laboratory was supported by ANVAR in the manufacture of a new anticancer drug."

"In 1990, we decided to intensify our activities in this direction," explains Daniel Moers, marketing and services director at the ANVAR head office. "There are fewer medium-sized companies in France than in several neighboring countries; when they are active in a traditional sector, they sometimes develop a curious complex which causes them to hesitate to come to us and propose a project that—to them—appears too modest from a technological viewpoint. It is up to us to find the words and the tools to encourage 'these sleeping beauties' to take the plunge without, however, disavowing their past and their know-how."

[Box, p 5]

Beside Young Companies

ANVAR participates with venture capital companies in the creation of technological companies. The agency granted some Fr300 million to this end in 1990. The venture capital companies provided Fr227 million in 1989.

[Box, p 5]

Business Plan for ANVAR

ANVAR, neither public service nor private company, defines itself today as a "public-service company." With the sternness of one, the flexibility of the other, and, if possible, the efficiency of both. In order to define its long-term strategic priorities and affirm its innovation engineering task, a common frame of reference had to be developed which could be used by any of the 350 ANVAR agents for inspiration in his or her daily work. Thus, a business plan was worked out. Six months of thinking with one-third of the staff involved resulted in the definition of 60 priority measures. Now the plan has entered its application phase. On the agenda: efficiency analysis of the agency's internal procedures; creation of a quality control function; establishment of sector-related "expert groups"; study of the competences to be developed within the agency so that the needs of companies can be satisfied better; opening toward Europe; development of partnerships; constant evaluation of projects.

[Box, p 6]

Zeroing In On Medium-Sized Companies

Since 1990, ANVAR has intensified its overtures toward medium-sized companies. As a result, the amounts granted to them, which represented 29 percent of all ANVAR assistance in 1989, reached 36 percent in 1990. Caution: When these companies are subsidiaries of large groups, they must fulfill two conditions in order to receive ANVAR assistance: independence and an autonomous R&D policy. [End of Box]

Tailor-Made Solutions

When following this reasoning step by step, it can be concluded that no company—with the exception of the

major groups that have sufficient resources of their own—is found to be ineligible for aid. Great, but are ANVAR's tools sufficiently flexible to meet the needs of a traditional small- and medium-sized company that has difficulties in identifying its technological shortcomings, as well as those of a medium-sized company that immediately places itself in the international market?

ANVAR's reply: Our ambition, as laid down in our business plan, is to provide solutions that are adapted to the needs of all companies. How? On the one hand, by precisely tailoring our tools to the expectations of companies facing a new economic deal and, on the other, by conducting an active policy of partnerships in coordination with all other innovation-promoting organizations so that the most coherent service possible can be offered in a concern for effectiveness and quality.

In other words, new instruments for financing, know-how, and teaming up were developed in 1990 on the national as well as international levels. Follow the guide!

[Box, p 6]

Requirements Survey

ANVAR commissioned the Bernard Juilhet group with a market and requirements survey targeted on three priority groups: young technological companies, medium-sized companies, and traditional companies. With respect to companies that are ANVAR customers, the three major needs are: financing (90 percent), know-how (56 percent), and development of relationships (44 percent). The demand for innovation engineering is particularly pronounced among young and traditional companies. Of companies that are not ANVAR customers, 60 percent do not use any original technology and 77 percent have not applied for a patent in five years.

Although the services offered by ANVAR are received favorably, these companies are not used to receiving outside support. The need exists, however: One company out of four had to abandon a technical project for lack of adequate funds. The main concerns discovered from talks with companies that are not customers are: concern as to the confidential nature of the files, projects considered by the companies as to require too little innovation, and a vague perception of innovation engineering. All these doubts definitely disappear when companies become customers. At the same time, they all state that their expectations are high in the area of counseling. [End of Box]

Raising the Technological Level

The principal need expressed by the companies is to find the means to raise their technological level.

The first tool offered by ANVAR and its partners is the network for technology dissemination. The ministers in charge of research and industry decided in December 1989 to launch this pilot operation. The principle of the network is to bring together all regionally operating

organizations that are already organized in more or less formal networks with the aim of bringing together companies and laboratories (such as the Regional Directorate for Industry and Research (DRIRE), the Regional Delegation for Research and Technology (DRRT), the Atomic Energy Commission (CEA), universities, the Regional Center for Innovation and Technology Transfer (CRITT), etc.), so that the technological needs of small- and medium-sized industries can be better satisfied. And since ANVAR has solid experience in the field of innovation, it was assigned with the network secretariat.

The objective of this network? "Very simple," replies Jean-Francois Lafaye of ANVAR's head office, "out of 70,000 companies polled, it is estimated that 20,000 would probably innovate. The fact remains that most of them do not know whom to turn to or how much support they can count on. Moreover, they are not generally in the habit of working with outside advisers. The network members are thus there to inject the innovation virus into those companies that are particularly sensitive."

The project was launched in early 1990 in four pilot regions in close cooperation with the CEA. In Rhone-Alpes, Lorraine, Brittany, and Limousin, partners get together, sign an ethics agreement (designed mainly to ensure confidentiality), establish a canvassing plan suited to their region, and begin systematic visits to companies. "Either the members that visit the company are themselves competent to deal with the company's case," explains Claude Sautour, regional representative in Brittany, "or they are not and then they look for the respective specialist, even if they have to find him in a region other than their own, a situation which represents 15 percent of the cases now."

Imagine, at this time! A crystal glassmaker encounters difficulties in fusing glass in a cold crucible: A CEA engineer provides the necessary know-how. A small- or medium-sized company in the clothing industry has developed a textile which helps eliminate perspiration: A marketing consultant helps it identify market niches which it could target. A young company creator educated at the Fine Arts Academy designs an ergonomic sleigh for mountain rescues: A technician helps him develop the industrial manufacturing process.

There are three main reasons for explaining the regular increase in the technological services of the network. First, the simplicity of the procedure. Second, the fact that 75 percent of the invoice is paid by the network (ceiling: Fr35,580, inclusive of all taxes). Third, the company is certain to find the right specialist thanks to the interdisciplinary and interregional nature of the network. The network covers 10 regions in 1991: Brittany, Lorraine, Rhone-Alpes, Limousin, Midi-Pyrenees, Center, Poitou-Charentes, Nord-Pas-de-Calais, Champagne-Ardenne, and Basse-Normandie.

[Box, p 7]

Network for Technology Dissemination

By the end of 1990, 1,500 companies had been approached by the network. Among them, 40 percent were not known to the contributors and 50 percent had barely touched the question of technology transfer. During this first year of operation, Fr11 million were granted through 356 technological services contracts. While most of the services affected small- and medium-sized companies with less than 10 employees (92 companies), companies with more than 50 employees also benefited (65). The traditional sectors are major users of the network: agro-food (20 percent); building and public transportation (4.9 percent); construction materials (6.2 percent). The services are divided into four major groups: technological audits and studies (42 percent); technical tests and improvements (30 percent); scientific and technical information (19 percent); first patent application (9 percent). In order to speed up and increase exchanges, an online database called Regatec (available via Minitel code 36.14) enables all members of the network to coordinate their actions and exchange information. [End of Box]

Technology Acquisition

Another approach for a company wishing to enhance its technological level consists in hiring a researcher.

This is often the first technological input which enables a company to have the R&D nucleus which it lacks, or to stimulate a team of in-house engineers and technicians and develop a technological capacity which already exists. More than just additional competence, the hiring of a researcher often confers a new awareness for the greater benefit of the company, as is being acknowledged by companies that have benefited from assistance when a researcher was hired. Furthermore, the Ministries of Research and Industry have just decided to extend this help to companies with up to 2,000 employees (as compared to 500 so far). Of course, each company preserves the right to choose the person to be hired, as in the past.

Transfer of people is one approach, transfer of technologies opens another. Help in technology transfer is the third procedure that ANVAR has changed this year.

"Technology transfer has existed for a very long time and in multiple forms: transfer from a laboratory to a company, from one industrial sector to another, from one country to another," notes Jacques Batail, technology director at ANVAR. "Isn't there a story about a Chinese princess who was promised to a Mongolian prince and hid silkworm eggs and mulberry seeds in her hair in order to transfer to her future kingdom the production methods for this precious material that China wanted to keep exclusive title to?" Nowadays, princesses have disappeared, but the transfer spirit remains. It brings together two individuals: a public or private provider of technology and a public or private

receiver of technology. Other agents can be added to this basic equation: They are called intermediaries, developers, transfer brokers. Whether they are technical centers, companies, laboratories, contract research companies, or consultants, these intermediaries work on adapting an innovative project to industrial constraints. ANVAR offers its aid to this technological triumvirate. And this is new. In fact, for a long time ANVAR's activity was concentrated on research laboratories, the main purveyors of innovation in France. But the landscape has changed. Several actors now are involved in this process. Laboratories, of course, but also intermediaries, and companies. ANVAR's logical conclusion: Let us not neglect any of these negotiators and let us therefore expand our support!

[Box, p 7]

1,000th Researcher Hired

In September 1990, ANVAR blew out the 1,000th candle to celebrate the 1,000th hiring of a researcher. Last year 440 subsidies were granted to this end. It should be noted that 40 percent of the first 1,000 hirings concerned companies less than three years old.

[Box, p 7]

Contract Research Companies: Special Mention

Contract research companies (SRC) enjoy particular support at ANVAR. In 1990, they received Fr101.9 million in the form of proportional subsidies for research contracts concluded with large companies. For contracts concluded with small- and medium-sized companies, ANVAR's subsidy is raised to 50 percent.

[Box, p 8]

From Technology Implementation to Technology Brokerage

What is the situation concerning the implementation of public research findings, the mission for which ANVAR was created in 1969? At the end of a study conducted by ANVAR, an inquiry was commissioned by the Ministries of Research and Industry to Jean-Claude Derian in July 1990 to study the timeliness of creating a technology implementation and transfer venture whose stock would be owned not only by ANVAR and research organizations, but also by large private companies and financial institutions. In contrast to other countries, a large portion of French research is conducted in public laboratories. In order to implement and market the results among companies, it would be appropriate to have a powerful structure that unites the various organizations which have been involved with technology implementation since the 1982 law on research planning and orienting. According to the proposed plan, this structure could take the form of a limited partnership. It would have a twofold mission: consultant in patents, licenses, or technology transfers and venture capitalist. However, with extended funds (Fr50 to Fr60 million in stockholders'

equity in the initial phase), this subsidiary would be in a position to play the role of international technology broker. [End of Box]

Bringing Together Technology Transfer Organizations

Means now exist to ensure technology transfers and to make all the investments that will precede, accompany, and follow them, from a market study through implementation of the innovation program or hiring of a researcher to a design study.

It is all right to contact a company laboratory, but you also have to be able to identify people offering and demanding technologies. To this end, ANVAR has developed another original tool: technology exchanges.

These exchanges bring together private or public, French or foreign suppliers of technologies and seekers of technology who are motivated by the prospect of a transfer or innovation program. Paul Rabette, in charge of this matter at ANVAR's technology department, explains: "For months, regional delegations and the Paris head office centralize and carefully study the incoming offers and demands. They are collected, compared, and their appropriateness checked. At the end of the study, suppliers and demanders are brought together. Cooperation agreement, licenses, patents, preparation of a subsequent transfer: The contact has been established."

In the end, is one to believe that technology transfer is the answer to all problems?

"Not at all," replies Jacques Batail. "Technology transfer is only one way to innovate."

"Some companies are perfectly capable of in-house innovation. Solo races are becoming more and more dangerous. Moreover, the figures speak for themselves: Almost 50 percent of ANVAR-supported projects imply a partnership of some kind: technical or commercial, national or international."

"One thing is certain: The more ambitious the project and the more successful the company, the greater the need to search for foreign partners."

"And this is all the more so," specifies Jean-Claude Poree, director of international relations, "as the main consequence of the opening of markets and continuous innovation is a shortening in the life cycle of products. If investment expenditures remain essentially the same, the write-off period must definitely be shortened. That's why it is necessary to make inroads in larger markets, such as Europe, and share the risks with partners."

Easier Access to EUREKA

That is also the reason for ANVAR's desire to open up resolutely toward Europe, to tie the strings of a vast network with all foreign innovation players, and to become the partner of European size that companies expect. Although it may hold the aces for investing in

Europe, the innovating small- and medium-sized company is often handicapped by its size when it wishes to penetrate the European market. How can this problem be solved? By cooperating with other companies, a practically unavoidable method for any company that wants to preserve its flexibility and still attain the critical size, the size which will enable it to dominate its market.

"Europe is a high-powered engine for the development of companies," adds Jean-Claude Poree. "We have therefore devised tools which enable companies to take advantage of this high-power engine. In other words, to give them easier access to the EUREKA program, whose mission is to develop European technological cooperation."

Thus, ANVAR created a specific procedure to encourage French small- and medium-sized companies that are candidates for Europe to step up their involvement in EUREKA projects, especially as leaders. Its name? Aid to European technological partnerships. Its ambition? To help French small- and medium-sized companies—which do not always have the time, manpower, or methodology for preparing a EUREKA project—to take the right steps and to simplify their moves. The procedure comprises two phases: first, search for partners and check the feasibility of the project; and second, prepare the contract negotiations and the setup of the EUREKA project.

Of course, the EUREKA program is not the only, sacred approach. If precompetitive EC programs, such as the European Strategic Initiative for R&D in Information Technologies (ESPRIT), or technological cooperation initiatives which cannot claim the EUREKA label are better suited for a company's project, ANVAR may also provide financing through the "aid to innovation" or "aid to innovative services" procedures.

[Box, p 9]

Aid to European Technological Partnerships

The "aid to European technological partnerships" procedure was created in April 1990 in line with official wishes. It offers specific support to small- and medium-sized companies that wish to establish European partnerships and take the lead in a EUREKA project.

The aid comprises two phases:

- Definition of the project with respect to the overall strategy of the company and the search for partners;
- Preparation of the partnership agreements and preparation of the EUREKA file.

In 1990, 35 grants were provided for a total amount of close to Fr15 million. The companies that received aid have between 7 and 1,200 employees (50 percent have fewer than 50 employees, 9 percent more than 500 employees). The largest beneficiaries of aid are the electronics and computer sectors (43 percent), followed by pharmaceutical and biomedicine (23 percent).

Finally, the search for partners is directed essentially toward Germany (28 percent) and the United Kingdom (14 percent). [End of Box]

One Year Under the Sign of Partnership

The rapid change in the international economic landscape also implies that all the innovation players must work together to enable companies to have access to the most efficient funding schemes. In addition to its cooperation with the French EUREKA secretariat, 1990 will have been placed, as far as ANVAR is concerned, under the sign of partnership. Or, better expressed, partnerships.

First of all, partnerships on a regional level. The agency has been cooperating closely and for a long time on the financial level with regional or county agencies that sometimes supplement its aid to innovation. In 1990, ANVAR and the regional councils decided to undertake a new strategy: The expectations of companies are analyzed in each region so that the agreements correspond to the local needs in each case. For instance, the agreement in the Rhone-Alpes region promotes the international development of small- and medium-sized industries. In Champagne-Ardenne, the emphasis is on financing the manufacturing and marketing processes. Everywhere, the clauses referring to the exchange of information and to the coordinated financing of the two crucial phases of innovation (development and launch) enable ANVAR and its regional partners to better combine their efforts to the benefit of the technological company.

Second come partnerships on the national level. In order to emphasize its support in the creation of innovating companies, the agency continues its partnership with venture capital companies. At the technological level, ANVAR reinforced its cooperation with public research institutes, in particular the National Center for Scientific Research (CNRS), the CEA, and Electricity of France (EDF).

[Box, p 10]

Agreements Between ANVAR and Venture Capitalists

Two agreements were signed in 1990 between ANVAR and the venture capital companies Creadefi and Sofimac.

Capital Forums

After Strasbourg and Amsterdam, where eight French innovating companies concluded an agreement with venture capital firms for a value of Fr40.7 million, the latest forum between ANVAR and the European Venture Capital Association (EVCA) was held in Lyon in

March 1991. Capital forums and technology exchanges now benefit from EC assistance through the Strategic Program for Innovation and Technology Transfer (SPRINT). [End of Box]

Europe: The First Springboard

Third, there are the partnerships on the European level. By organizing capital forums for technology with the European Venture Capital Association, ANVAR makes it possible for the most promising companies to meet European investors. Another European dimension: To confirm the European slant of its activities, ANVAR coordinates its tasks with those of EUREKA. This coordination led to numerous contacts with organizations that play a similar role in Europe. The first concrete result of these exchanges was an agreement signed with the Finnish Tekes on 18 September 1990 (Finland will assume the chair of EUREKA as of June 1991). This agreement stipulates that ANVAR and Tekes rearrange their efforts to facilitate partnerships between French and Finnish companies. Another European opening: In order to combine its efforts with those of other foreign organizations, ANVAR takes part in Eurotech, the first European technology transfer network. Eurotech, which is financed by the EC SPRINT program, interconnects 11 of ANVAR's European counterparts and seeks to give companies access to the research results from European laboratories.

Finally, Europe's "apprenticeship" is largely based on information. The agency therefore contacted the National Association for Technical Research (ANRT) which disseminates information on EC programs. Several jointly organized events made it possible, in particular, to promote the BRITE-EURAM [industrial technologies/advanced materials] program.

Beyond Europe, there is the wide world. Companies know it, and so does ANVAR. It is therefore developing tools such as Facet, to help companies enter the U.S. market (joint ventures) and it signs agreements with U.S. universities and states. In the same spirit, the agency takes part in a program between France and Quebec and one between France and Israel.

"We do not want Europe to change into a Maginot line," warns Jean-Remi Gouze. "It represents a first training ground and also a first springboard. ANVAR does not impose any limit on itself. If it gives preference to the European turf, the reason is that Europe is the right geographic and cultural size." European overtures to stimulate R&D, regional anchorage to increase the efficiency of innovation players: This two-pronged, European and regional approach will enable ANVAR to help the French small- and medium-sized companies score points.

Innovation Funding

91AN0447B Paris *COURRIER ANVAR* (ANVAR MAGAZINE supplement) in French Apr 91 pp 33-36

[Article: "Aid to Innovation in 1990"]

[Excerpt] [passage omitted]

Sustained Innovation Effort by Small- and Medium-Sized Companies

The movement which started in 1989 gained momentum in 1990. In line with the priority assigned by the government to innovation and industrial research, ANVAR's working funds were increased and this enabled the agency to provide aid to innovation to the tune of Fr1.415 billion in 1990, as compared with Fr1.330 billion in 1989.

In 1990, Fr1.24 billion out of Fr1.415 billion were allocated to support innovating companies. The total amount was divided as follows:

- Fr1,022.3 million for 1,210 subsidies to company innovation projects;
- Fr80.2 million for 440 subsidies to hire researchers;
- Fr35.3 million for 16 subsidies to company transfers.

The average amount of project aid per company (excluding Coface/ANVAR aid and aid for hiring researchers) was Fr890,000 (compared with Fr785,000 in 1989). This corresponds to innovation programs of Fr2 million or more, on the average.

This increase in the average amount is explained by:

- More ambitious innovation programs which, in 40 percent of the cases, include a partnership;
- A change in the size of companies in line with ANVAR's policy to stimulate projects of medium-sized companies: 36 percent of subsidies were granted to companies with 100 to 1,000 employees (compared with 29 percent in 1989).

In 1990, ANVAR announced increased support to young companies of less than three years old: They received almost Fr300 million, i.e., 20 percent of the total innovation aid. These companies were heavy users of the innovation services prior to their start-up and during the first three years of operation (market studies, legal studies, industrial property, etc.).

These young companies call largely for help in hiring researchers: In 1990, they received 189 subsidies out of a total of 440. Let us recall that ANVAR announced this year its 1,000th hiring of a researcher and that this sort of aid has been extended to companies with fewer than 2,000 employees.

As compared to 1989, the amounts of aid granted to innovation services increased as well. This increase

corresponds to heavier use by companies of preliminary services in preparation for innovation programs, but also to the launch of new products:

- Aid to European technological partnership (Fr15 million);
- Technological services supplied within the scope of the network for technology dissemination (Fr11 million).

The year 1990 was marked by a change in the agency's technology transfer policy: Transfer aid is no longer limited to the implementation of upstream research results and their downstream development, but now extends to all operations, whether they are intercompany, intersector, or transnational transfers.

Out of the Fr80.7 million dedicated to transfer aid, Fr35.3 million were allocated to companies that had developed a technology coming from a laboratory or a company. Other essential players of technological development are contract research companies. In one year, 40 of them received Fr101.6 million in supplementary funding for contract research conducted on behalf of industrial companies.

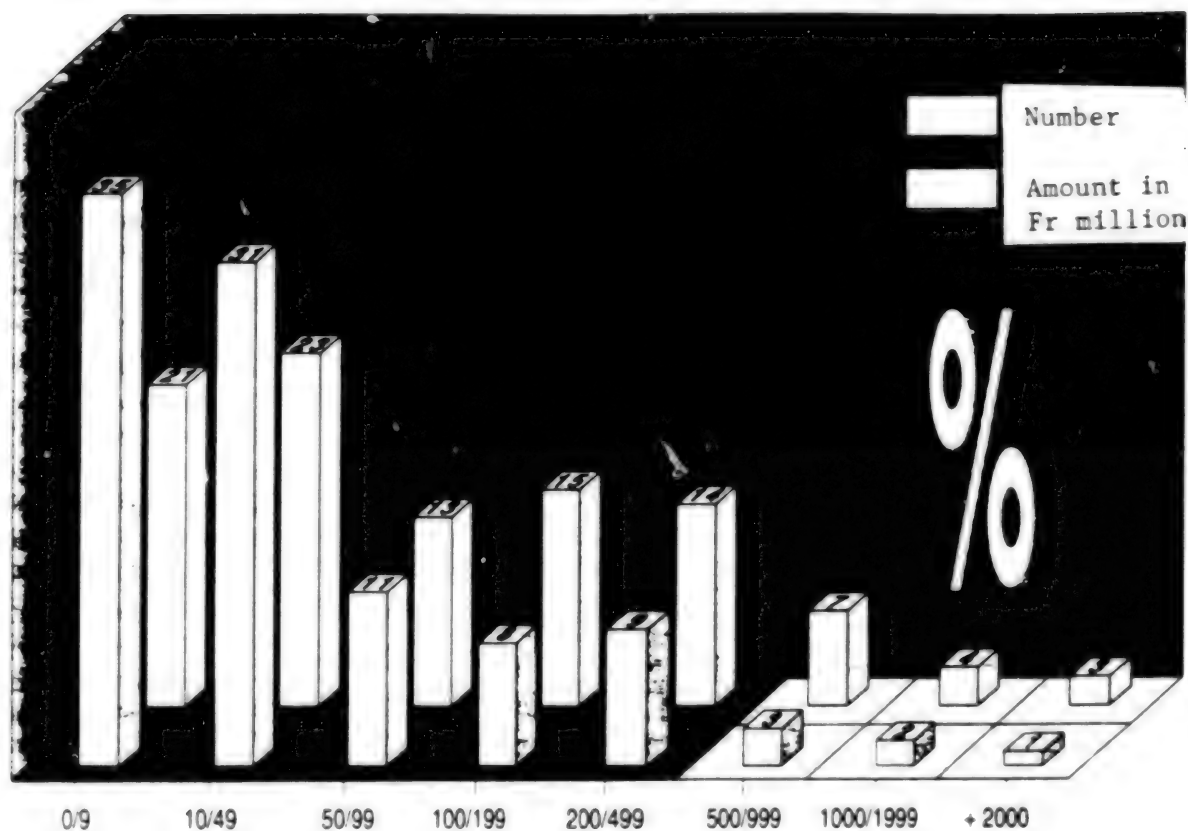
Table 1. 3,927 Files Worth Fr1,415.2 Million in Funding

	Number of Files	Amounts Granted (in Fr million)
Aid to innovation projects	1,656	1,102.5
—including hiring of researchers	(440)	(80.2)
—and Coface/ANVAR aid	(75)	(6.6)
Aid to innovation-oriented services	1,000	106.3
Aid to technology transfers/ Aid to technology transfer services	148	80.7
Subsidies to contract research companies	40	101.9
Public relations campaigns to interest young people in innovation	906	13.9
Self-employed inventors	177	9.9
Total	3,927	1,415.2

Compared with 1989, there is no very significant change: Computer science and electronics, instrumentation, and the agro-food sector still hold the first places in the number of files. At the most, an increase in the amounts granted to instrumentation and, at the same time, a slight decrease in computer science electronics is noted. The agro-food sector also suffered a small erosion in both number of projects and funding levels.

The mechanics/robotics sector was still holding third position in 1990 for the size of the amounts granted.

Aid to Innovation Projects Granted in 1990 (by size of company)



Aid to Innovation Projects in 1990—Breakdown by Amounts

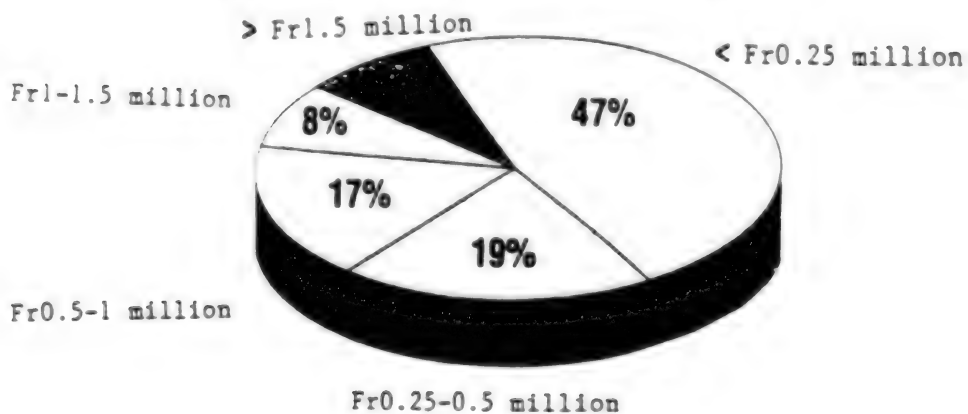


Table 2. Breakdown by Sector of Aid to Corporate Innovation Projects (excluding Coface/ANVAR aids)

	Number of Files (%)		Amounts Involved (%)	
Agriculture, fishery, aquaculture	4.9		3.1	
Agro-food	8.7		6.8	
Wood, paper	1.4		1.6	
Leather, textiles, clothing	3.5		4.4	
Iron and steel, metallurgy, foundries	2.3	2.3		
Mechanics, machine tools, robotics	6.1		9.1	
Construction materials, building, and public transportation	5.6		5.5	
Glass, ceramics, composite materials	1.9		2	
Chemistry, parachemistry	2.9	5.2	2.5	3.9
Pharmaceutical	2.3		1.4	
Primary energy, thermal energy	2	5.3	1.8	6.2
Electrical engineering	3.3		4.4	
Instrumentation: precision, measurement, control, biomedical, watchmaking, optics, laboratory equipment, safety	14.4		17.5	
Electronics, computer science	17.7		13.2	
Consumer products	7.2		7.1	
Packing, handling	5.1		5	
Shipping	3.8		6.1	
Various: ferments, extractive industries, waste water, waste, offshore/space, processing of plastics and rubber, graphic arts, service industries	6.9		6.2	
Total 100 percent	1,581 Files		Fr1,095.9 million	

Implementation of Research

In 1990, 62 operating licenses were granted for research results. During the same year, 122 French patents and 961 foreign patents were applied for. The agency now

holds a portfolio of 536 license contracts, including 347 that were given to small- and medium-sized industries.

Table 3. ANVAR Research Implementation Projects: Status as per 31 December 1990

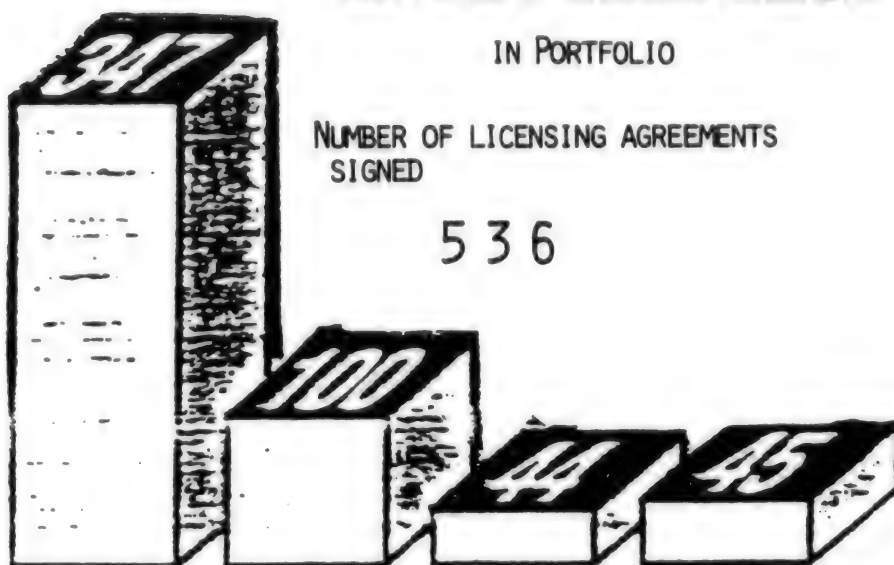
	From 1 January to 31 December 1990	Portfolio
Open files	68	
Files dealt with during period		1,846
Active files at end of period		1,418
Contracts signed in 1990	85	
—including 62 operating contracts (50 licenses, 10 options, 2 marketing authorizations)		
—including 23 other contracts (23 GBM funds)		
Contracts dealt with		885
Patents registered in France	122	
Basic patents extended to foreign countries	75	
French patents dealt with		1,455
Patents registered abroad	961	
Foreign patents dealt with		7,210
Transfer aid granted:		
—Number	148	
—Amount	Fr80,715,964	
Revenues received in 1990 on operating contracts	Fr12,934,263.78	

SIGNATORIES OF LICENSING AGREEMENTS

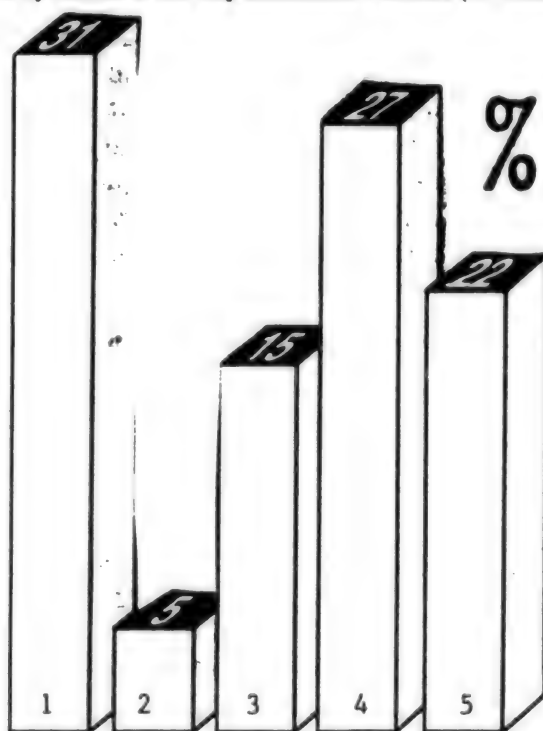
IN PORTFOLIO

NUMBER OF LICENSING AGREEMENTS
SIGNED

536

SMALL- AND MEDIUM-
SIZED COMPANIES
AND INDUSTRIESLARGE
GROUPSRESEARCH
ORGANIZATIONSFOREIGN
COMPANIES

Breakdown by Sector of the Implementation Portfolio (31 December 1990 Status)



Physique Mécanique Electronique Matériaux Chimie Biologie

SECTEURS

Key: 1. Physics 2.—Mechanics 3.—Electronics 4.—Materials 5.—Chemistry/Biology

At the request of the Ministries of Industry and of Research and Technology, an exploratory survey was entrusted to Jean-Claude Derian in July 1990 to study whether it was opportune to create a technology transfer and implementation agency which, through its company capital, would include ANVAR, research organizations, as well as a few private companies and financial establishments. This agency would then handle the transfer of technologies originating from public and private research.

Flanders Minister Revises S&T Policy

91AN0437 Zellik *TECHNIVISIE* in Dutch 15 May 91
p 3

[Article: "Science & Technology Policy in Flanders: Toward Technological Developments With a Positive Social Impact"]

[Text] Norbert De Batselier, minister of economic affairs, small- and medium-sized businesses, and energy [of the Flemish community], presented the new technology policy for Flanders on the occasion of the Flanders Technology International (FTI) trade fair. The essence of this policy document is a new function scheme adapted to current requirements, taking into account the needs of small- and medium-sized businesses, the foundation of the Institute for the Promotion of Scientific and Technological Research in Flanders (IWT), the foundation (after all) of the Flemish Institute for Technological Research (VITO), and various incentive programs which have already begun or are in the pipeline. The policy document is part of a wider social plan based on a social survey called the Technology Assessment Survey.

Financing, Coordination, and Research Centers

Apparently, many obstacles exist in our country which hinder product innovation, and one of them is cost. Under the current funding scheme, support is only available through a system of reimbursable interest-free loans. With the currently proposed system, basic industrial research will henceforth be financed by subsidies (of up to 50 percent of gross costs). Small- and medium-sized businesses will receive an additional 10 percent on top of the normal subsidy. These proposals have been approved by the EC; they will remove a major obstacle and, in addition, they will stimulate cooperation between universities and companies. The system of reimbursable loans will also apply to precompetitive research (prototypes, process development, etc.). The IWT, which is soon to start operations, will be charged with centralizing and coordinating financial aids to scientific and technological research (supporting basic research, channeling cooperation between companies and research centers, and developing various support activities). A new research center is to be set up: the Flemish Institute for Technological Research. VITO will concentrate on three research areas: energy; environment and biology; and, finally, raw materials and new

materials. The institute will also assist companies, for example, by carrying out feasibility studies.

Finally, the Flemish technology policy proposals also cover the various incentive programs (Biotechnology, New Materials, Energy Technology, etc.). They will be organized according to a decentralized approach, whereby several expert centers will be requested to develop new spearhead technologies in various fields. The incentive programs are basically an attempt to direct scientific and technological research toward technological developments that have a positive impact on society as a whole.

Germany: Cabinet Changes Threaten BMFT Chief Riesenhuber

91WS0444A Munich *HIGHTECH* in German No 6,
Jun 91 p 6

[Article: "Riesenhuber's Vacuum and the Consequences"]

[Text] A lively difference of opinion has surfaced in the German Ministry for Research and Technology (BMFT) about the technology-policy role of its highest principal. While in one camp the conviction is held that Heinz Riesenhuber's months-long delay in outlining the main directions for the future is completely in the interest of industry's insistence on minimal overall Government influence, the other camp considers the ministers' apparent lack of vision to be a deficiency with possibly serious consequences.

Riesenhuber's internal critics more than ever regret the absence of a clear position in the public discussion of the rationale for and the advantages of the manned space program, which is now enveloped by massive financial problems. And the critics are also voicing complaints that their ministerial manager has not exerted sufficient pressure in the matter of Europe's strategically vital race to catch up in the field of microelectronics, especially in the JESSI Project (Joint European Submicron Silicon Initiative).

There are even unvoiced fears in the BMFT itself that Riesenhuber's technology-policy vacuum could soon be filled by others. As early as January, leading officials had urgently warned the minister in internal memoranda about just such a possibility, and recommended that he call Konrad Seitz, the neutral ministerial director in the planning staff of the Foreign Office (AA), on the carpet. Seitz had made a name for himself on the sensitive topic of Japan's technological challenge with profound analyses and recommendations that far exceeded the bounds of his competence. Furthermore, he has excellent contacts in the German Ministry of Economics, especially with its head Juergen W. Moellemann.

Such qualities could carry weight with Chancellor Helmut Kohl in connection with the reorganization of the Cabinet announced for next Autumn, especially if the research minister has by that time not yet succeeded

in convincingly polishing his image to a high shine. In any case, Konrad Seitz is a decisive advocate for an industry-policy coordination office, similar to Japan's Ministry of International Trade and Industry (MITI).

"At the moment we have a terrible struggle even in evoking interest in our research projects," Christian Patermann, Riesenhuber's chief assistant and head of the BMFT's managerial staff lamented. His search for reasons indicated that the primary cause of the malaise resulted from German reunification, "because the basic problems in the East are currently preoccupying everyone."

In addition, the continuing departure of highly qualified personnel to the five new Federal States has now also sharpened the explosive situation in the research ministry. Would-be candidates from major German research establishments, for example, are respectfully bowing out, giving as their reason the as yet unresolved question as to the site of the capital—Bonn or Berlin. Others have already decided for a career in East Germany. Some of BMFT's managerial offices have suffered a loss of up to 50 percent of their higher officials in the last six weeks. "The ministry," Patterman said despairingly, is continually hemorrhaging.

Germany: Fraunhofer, Max Planck Organizations Compared

91MI0384 Duesseldorf *HANDELSBLATT* in German
23 May 91 p B9

[Article by Werner Osel: "Joseph von Fraunhofer and Max Planck Can Feel Satisfied"]

[Text] With the Max Planck (MPG) and the Fraunhofer Society (FhG), Munich hosts the headquarters of two major research organizations.

The more than 60 research institutes, teams, and research facilities and more than 30 "short-term junior teams" that belong to the Max Planck Society for the Advancement of Sciences in Munich are engaged predominately on basic research. In 1949, what was formerly the Kaiser Wilhelm Society moved from Berlin to Munich, and it will certainly remain there for the foreseeable future.

Of the total of 8,700 permanent employees in the various MPG establishments, 2,400 are scientists. There are also some 3,000 scholarship holders, half of them from abroad. A further 1,600 doctoral students per year receive training in the MPG that is integrated into the research process.

This year and next, the MPG is establishing around 25 fixed-term teams at the universities in the new laender and east Berlin, which will eventually take them over. In the coming years, the MPG will also set up project teams and institutes in the new laender.

For historical reasons, the distribution of the institutes varies from one region to another, according to whether the federal laender showed more or less active interest in the MPG's reconstruction and expansion phase in the fifties and sixties. Bavaria was one of the most active, hosting many MPG institutes.

The members of the MPG, individuals and corporate bodies who "wish to further science," elect senators who, together with senators appointed ex officio, such as federal and land representatives, form the senate, which is the central decision-making body of the MPG. The MPG's president, Prof. Hans F. Zacher, chairs the administration council (board).

The MPG combines basic research in physics, astronomy, chemistry, and mathematics in a chemistry, physics and engineering section. Research into the "living world" is the responsibility of the institutes in the biology and medical section. Psychology, education, sociology, jurisprudence, and history are topics covered by the third, humanities, section.

It is the rule that all facilities grow with their workload, but also shrink or close as soon as basic research is so far advanced that further work can be handed over to university research. Only in this way is the MPG able to take up new fields of research. The MPG thus keeps its structure flexible and can focus its potential on new basic research work. Of course all scientists promise to be flexible and to respect preferences, but those in a position to know are convinced that the MPG has proved the most impressively forceful in these matters.

Around 94 percent of the annual MPG budget of some 1.3 billion German marks [DM] (1990) was raised by joint financing, half of which comes from federal and half from land funds. Federal and land project funding, the Federation of German Science Foundations, and private foundations accounted for a further 12 percent. The rest came from earned income, grants, and donations.

The Two Bodies Complement One Another, Despite the Difference in Goals

While the MPG carries out basic research, the Fraunhofer Society for the Advancement of Applied Research, which has its headquarters in Munich, concentrates on topics that hold out prospects of marketable products and systems. It employs 6,000 people, one-third of whom are scientists and engineers, in 38 research institutes. From 1991 there will also be nine major new establishments and numerous branches in the new laender. This year, the FhG's research account will exceed DM845 million, DM630 million of which comes from contract research. Defense research accounts for about another 10 percent in the current year.

Priority areas are topical subjects offering substantial scope, such as microelectronics, information technology, production automation, manufacturing engineering, materials and components, process engineering, power and structural technology, the environment, and health.

On contracts, the FhG researchers work closely with industrial companies of all sizes, exploiting the synergies arising out of interaction to achieve results, i.e., products, as quickly as possible. In principle, all FhG establishments and their scientific and technical capacities are always available for all projects. Complex problems can therefore be solved through the cooperation of several institutes using different methods and skills. Thus even small and medium-sized companies can take advantage of wide-ranging knowledge and a variety of experience and skills.

The different aims of the two Munich societies are clear: While the MPG continues the tradition of the venerable Kaiser Wilhelm Society and can from time to time proudly present a Nobel prizewinner, the comparatively young FhG directly promotes innovation in industry. The two bodies are not in contrast, but complement one another. After all, the FhG institutes can exploit a lot of the basic findings achieved by the MPG's scientists.

In the last 50 years, both organizations have been able to develop in a research-friendly environment: The constitution guarantees freedom of research, which is carried out on a pluralistic basis in the FRG. A large number of research institutes have grown up that simultaneously compete and cooperate with one another and receive many types of material support.

New influences are coming into play in the European Community: countries such as Greece, Portugal, Spain, and Ireland had, until recently, done little for their research. In the European domestic market, Germany, France and Great Britain account for 80 percent of all state spending on research. When Italy is included the figure rises to 90 percent, while the Benelux countries and Denmark account for three-quarters of the remaining 10 percent. The previous president of the Max Planck Society, Prof. Heinz A. Staab, had already warned that this pronounced difference in science within the Common Market must not lead to a levelling-out at, or even below, the average standard.

The more stringent controls threatened by a centralized science policy would neither please nor suit German scientists. The MPG, for instance, has not suffered from the forced move from Berlin to Munich, indeed many believe it has benefited from it. The Fraunhofer Society has been in Munich since its foundation, but still operates throughout the Federal Republic, and now in the new laender as well.

At first glance the decentralized, pluralistic structure of German research may seem confusing to some observers, but what counts is that Germany's commitment and results are way ahead of the United Kingdom and France, standing third behind the United States and

Japan, which are bigger countries. Max Planck and Joseph von Fraunhofer can feel satisfied.

Max Planck To Establish Institutes in Former GDR

91MI0379 Bonn *DIE WELT* in German 4 Jun 91 p 25

[Text] The Max Planck Society (MPG) will considerably increase its commitment in the new federal laender this year. As its president, Hans F. Zacher, explained to *DIE WELT* immediately prior to the annual general meeting, which starts in Berlin today, the establishment of 15 to 20 Max Planck institutes is the "ultimate aim, although it will take several years to achieve."

Consideration is being given initially to founding five new institutes (economics, molecular plant physiology, enzymology of peptide bonds, nonlinear dynamics, and colloid and interface research) in eastern Germany. Talks are also under way in Berlin about the Science Council's recommendation to maintain the former GDR Academy's Central Institute of Solid-State Physics and Electron Microscopy in Halle "within the confines of a Max Planck Institute."

The MPG Senate decided back in March to set up 13 autonomous teams at universities in the former GDR. They have a five-year term and each is linked to a Max Planck Institute in the old laender, so that, says Zacher, they can benefit from the "parent institutes" both in technical and organizational terms and, first and foremost, from the scientific point of view.

Furthermore, the MPG supported "cooperation with scientists and research facilities in the former GDR, which was principally based upon personal contacts," to the tune of 2.1 million German marks [DM] last year. This enabled 100 guest scientists and scholarship holders to spend time at Max Planck institutes for research purposes.

In 1991, the MPG is expecting DM5 million for expanding its cooperation work, about DM2.6 million of which it has allocated so far, half to fund guest scientists and half for joint research projects between eastern and western German scientists.

Zacher reported that the MPG's 65 institutes currently have about 11,000 employees. The budget of the research society, which was founded in 1948 as the successor to the Kaiser Wilhelm Society for the Promotion of Science, is currently about DM1.3 billion.

German Metalworkers Union Paper on Restructuring Eastern R&D

91MI0380 Duesseldorf *HANDELSBLATT* in German 31 May-1 Jun 91 p 6

[Text] A Metalworkers Union working paper calls for the research capacities taken over from the GDR to be maintained to a large extent in the new federal laender

and for the trade unions to have a voice in corporate and intercorporate research policy.

Although large sections of the research and development facilities in the new federal laender are incompatible with the R&D capacities in the old ones, the process of creating economic and social unity must find a way of linking at least the productive R&D sectors of the former GDR's industry to facilities in the FRG.

The paper states that outline conditions for a unified German research and science system need to be worked out and that this cannot be done just by transposing the western German system into the new laender.

It would be much better to dovetail the research and scientific facilities in the new laender with those of the old ones and to renovate and modernize them gradually, whether inside or outside firms.

Productive research and science facilities in the new federal laender should therefore be maintained. The collapse of industrial research and development there should be countered in the short and medium term with financial support from the Federal Government and the western laender.

In the view of the Metalworkers' Union, the resources made available to date for these measures are insufficient. The highly qualified scientific potential available locally must be involved and deployed in promoting the industrial modernization of the eastern German economy.

The Science Council calculates that about 6.5 billion German marks [DM] will be required from now through 1995 (excluding the routine costs of running the universities) to finance urgently needed improvements in the research and teaching infrastructures in the new laender. It therefore calls for the establishment of a special research and science fund amounting to DM6.5 billion for the period from 1991 through 1995.

The creation and/or enhancement of R&D potential in structurally weak regions must be given priority in the restructuring of eastern Germany's research and science system. Only about 6 percent of the research and development potential is currently located in the north of eastern Germany, while about 33 percent is in the center and 61 percent in the south of the former GDR.

Investors involved in the former GDR should agree voluntarily to try to pay much more attention to facilities and potential in the new laender when research contracts are awarded, studies commissioned, etc. It should be Trust Agency policy to ensure that, whenever a business is taken over by a western company, the maintenance of at least one of the core areas of its R&D capacity features on the negotiating agenda.

The union states that it is up to the Trust Agency, the economics and science ministries in the new federal laender, and the chambers of industry and commerce to use their influence on the investors involved in the new

laender to ensure that the research and development sector is taken into due consideration when new investments are made.

The level of investment provided for the research and development sector should be brought into line with the levels normal in the same branches of industry in the old federal laender. Coordination by the Federal Economics Ministry and the Federal Ministry of Research and Technology is needed.

The coordination of a research and development policy compatible with the structural and regional policy in each of the federal laender requires the establishment of "R&D committees" in the new federal laender. All organizations of relevance to research and development, including trade unions, should take part in these committees. A research and development report should be drawn up at least every two years by the government of each land.

Staff councils, at least in major companies, should be obliged to set up committees on R&D matters to observe developments in this field in their firms and to take action at an early stage if there is a danger of substantial cuts in R&D budgets.

Germany: BMFT Funds R&D At Daimler-Benz

91M10383 Bonn DIE WELT in German 23 May 91 p 1

[Text] Federal Research Minister Heinz Riesenhuber confirmed on Wednesday that about 2.6 billion German marks [DM] went to the Daimler-Benz company in both 1989 and 1990, but stressed that only DM230 million was supplied by the Research Ministry for project funding. However, Riesenhuber was quoting figures for 1989 and part of 1990.

This statement was the minister's response to recent reports that, since its expansion and restructuring, Daimler-Benz had become the largest recipient of subsidies, overtaking even Siemens. SPD Bundestag member Edelgard Bulmahn had recently called attention to this state of affairs.

Riesenhuber reported that Daimler-Benz had received DM1.4 billion from the Ministry of Defense, DM503 million from the Ministry of the Economy, e.g., for Airbus project funding, and DM481 million from the European Space Agency, ESA, each year. Basically, this latter sum also came out of federal funds. With its DM230 million, the Research Ministry (BMFT) ranked last in this list.

The Research Minister opined that the FRG government had always borne a moderate share of research funding in an "international context," with the political intention of helping the German economy.

Germany: Post-Unification Research Integration Report

91MI0367 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
30 Apr 91 pp 2-4

[Text] About 600 million German marks [DM] will be spent on research and development projects in the new federal laender this year, a sum that considerably exceeds the total increase in project resources. Federal Research Minister Riesenhuber underlined this point while presenting a "Report on Unification Policy in Research and Technology" to the Bundestag committee on research, technology and technology impact assessment. Two-hundred million German marks have been allocated to date for 626 projects. Together with the federal government's DM450 million share of the transition funding for the former Academy of Sciences institutes, the BMFT [Federal Ministry of Research and Technology] is providing DM1.1 billion for research and development in the new laender in 1991. In 1992, the BMFT will allocate at least DM1.5 billion in funding research and development projects and institutional research in the new laender.

Outlines of Future Institutional Research

The process of converting and preserving top-ranking research institutes on the basis of the recommendations made by the Science Council has been successfully launched. Examples: the Institute of High-Energy Physics in Zeuthen will be converted into a branch of DESY [German Electron Synchrotron], and the Institute of Space Research in Berlin will be incorporated into the German Aerospace Research Institute; a founding committee has been appointed to set up a new biomedical research institute in Berlin-Buch.

The Science Council is expected to submit its assessment ahead of schedule: It has already delivered verdicts on 22 of the academy's 62 institutes. Most of its assessment work will be completed by July. According to present estimates, between 7,000 and 10,000 employees of the academy's institutes will be considered for integration into new institutes. Fraunhofer Society and Max Planck Society institutes, major research institutes, and other facilities jointly funded by the federal and land governments (blue list institutes) will find room for 6,000 to 8,000 of them, while about 2,000 will be transferred to universities. The Fraunhofer Society will set up eight independent research institutes and 10 additional branches in the new laender, with a total staff of about 1,000, equivalent to about one-third of Fraunhofer Society posts in the old laender.

Neither the institutes under consideration by the Max Planck Society nor the blue list institutes have equivalents in the old laender. They include:

- Fraunhofer Society institutes of polymer research, electron-beam technology, ceramics technology, and optics and precision engineering;

- institutes being considered by the Max Planck Society for colloid and interface research and plant biochemistry;
- a blue list institute of aquatic ecology and inland fishing.

Transfers to the Private Sector

The joint office responsible for coordinating and winding up the former Academy of Sciences institutes and facilities provides initial aid to employees setting up their own businesses, for example through favorable tenancy contracts for working premises or real estate units, transfers of tangible assets on special terms, and salary subsidies for staff. The BMFT finances this funding by the coordination office via a business consultancy company that draws up procedures for setting up new businesses and for privatizing nonscientific Academy of Sciences facilities. The revenues from privatization will be credited to a scientific foundation for the new laender. Privatizations accomplished to date include the Boehlau and Academy publishing companies and a foundry with 220 employees. Five new businesses will be founded shortly, and 25 additional applications are being examined.

Safeguarding Productive Industrial Research and Development Capabilities

Companies in the old laender are called upon to allocate at least 5 percent of their research and development budgets to the new laender with a view to ensuring the survival of about 40 percent of the market-oriented research and development capacity in the new laender. The Trust Agency has responsibility for the development of valid industrial research projects in the new laender.

BMFT funding for R&D projects in the new laender is 10 percentage points higher, which means that companies need provide 20 percent less out of their own funds (the basic funding rate in the new laender is 60 percent as against 50 percent in the old laender. This means that for each mark spent by a company on research, the BMFT contributes DM1.50, as against DM1.00 in the old laender).

The BMFT has launched a series of special programs to help small- and medium-sized enterprises (SME's) that carry out research work, and to foster the growth of an innovative SME base. They include:

- Funding for R&D personnel recruitment: 600 applications involving about 2,000 new employees are expected for 1991 (the BMFT has budgeted about DM20 million for this purpose). Most applications to date have been submitted by electrical and mechanical engineering companies;
- Contract research: It is estimated that at least 500 applications will be submitted in 1991 for funds amounting to DM18 million. Most applications come from the mechanical engineering, textile, agriculture, and civil engineering sectors;

- Pilot scheme for "funding new technology-oriented companies": 175 applications have been submitted to date (the BMFT has budgeted about DM16 million for 1991);
- Technology and Entrepreneur Centers: The BMFT funds 15 centers in the new laender (DM14 million in 1990, with an additional DM11 million budgeted for 1991).

The BMFT has adopted numerous other measures aimed at improving the innovation infrastructure, including funding innovation consultants at the chambers of industry and commerce, setting up demonstration centers specializing in new areas technology (CIM [computer-integrated manufacturing], plastics technology), and extending the German Research Network.

Job-Creation Measures Accompany Restructuring in the Research Sector

At the instigation of the Federal Minister of Research and Technology, a new, special job-creation scheme for the research sector has been developed jointly with the office responsible for coordinating and winding up the former Academy of Sciences institutes and with the Federal Ministry of Employment and Social Affairs. The scheme is illustrated in a handbook published by the BMFT and entitled "Job-Creation Measures in the New Federal Laender's R&D Sector," which the Federal Labour Office is currently sending out to job centers in the new laender.

Job creation measures can help employees in research and development establishments survive the scientific and economic reorganization process. Along with the funds provided by the Joint Campaign for Recovery in the East, considerable funding is available for job-creation measures: about DM5.5 billion in 1991, part of which will be allocated to research. Job-creation measures will give employees with no short-term prospects of finding jobs in new nonuniversity research institutes, universities, or industrial research the opportunity to acquire new skills and enter new fields of activity.

Job-creation measures will relate primarily to work of relevance to the specific professional experience of research personnel, including:

- the study, analysis, and documentation of abandoned polluted areas near scientific sites and their reclamation;
- topical environment research issues, such as those relating to the development of water purification and sewage disposal processes, the renaturation of ecological biotopes, the decontamination of heavily polluted soil, and medical research, for example, statistical studies of various syndromes;
- introduction of rational energy exploitation methods and renewable energy production techniques;
- updating and conservation of archives and cultural assets;
- initiatives aimed at improving the industrial support infrastructure, for example, state-supported noncorporate advice and demonstrations on the introduction of the new industrial technologies such as manufacturing engineering, composites, and microelectronics;
- refurbishing and modernization of industrial buildings.

As of 1 April 1991, capital expenses too may be subsidized as part of job-creation measures, including expenses incurred in planning, preparing for, and implementing such measures, for example, the cost of machinery, equipment, materials, labor, and services. As a general rule, capital expenses may not exceed 30 percent of the payroll costs subsidized. While job-creation measures are under way, up to 20 percent of working hours may be devoted to raising qualifications (retraining, further training). These costs too are eligible for funding as capital expenses.

Research and development workers are already showing great interest in the opportunities provided by job-creation measures. According to present estimates, it should be possible to create 2,000 such jobs in the former Academy of Sciences sector. The recent decision to establish a decentralized network of job-creation scheme consulting centers in areas with a high density of R&D institutes will also help to ease the situation. The consulting teams will attend project courses together with the employment authorities. An initial seminar for 40 disseminators is being organized with the Treptow labor office, whose catchment area includes the Central Institute of Scientific Apparatus Engineering in Berlin-Adlershof. The first job-creation projects are already under way or pending approval (for example the project on the reclamation of contaminated sites in Berlin-Buch).

Lands and municipalities are called upon to implement job-creation projects for the employees of R&D institutes as well. They are particularly suitable, as they have skills relevant to most of the above-mentioned areas and thus stand the best chance of finding long-term employment.

According to the BMFT, job-creation measures also provide useful bridging support for market-oriented research, especially the limited liability research companies held by the Trust Agency, as they will facilitate the restructuring process. The BMFT has recently had initial talks with the Trust Agency's directors and is ready to help them implement job-creation measures for employees of research companies and to share the experience acquired in its dealings with the Academy of Sciences.

Germany: Carl Zeiss Privatization Plans Outlined

91M10405 Dusseldorf *HANDELSBLATT* in German
14-15 Jun 91 p 27

[Text] The tug of war over the operation of the Jena Foundation is over. The Berlin-based Trust Agency announced that the land governments of Baden-Wuerttemberg and Thuringia and Jenoptik Carl Zeiss Jena GmbH, Carl Zeiss Oberkochen, and Schott Glaswerke have reached an agreement.

The accord provides for a merger of the two Zeiss foundations into a joint corporation which is expected to be located both in Heidenheim and in Jena. Procedures are to be outlined in a treaty between the two FRG laender.

The "privatization project" provides for the shares of Jenoptik Carl Zeiss Jena GmbH to be transferred to the land of Thuringia and to Carl Zeiss Oberkochen. In the planned division of Jenoptik Carl Zeiss Jena GmbH, Oberkochen will take over the management of a company to be named Carl Zeiss Jena GmbH. This company, together with Jena Glaswerke, will be integrated into the corporation as soon as the economic prerequisites are met.

Trust Cancels Old Debts of 1.35 Billion German Marks

In addition, another company, to be called Jenoptik GmbH, will be established; its shares are to be held by the land of Thuringia. The optoelectronic [branch] and the majority of Zeiss real estate is to be concentrated in this company. Lothar Spaeth, personal advisor to Prime Minister Josef Duchac, is expected to become chairman of Jenoptik GmbH. According to Duchac, there is no better candidate.

The trust also approved the overall costs of the reorganization process. Of the 3.6 billion German marks [DM], DM3.3 billion will be funded by Jenoptik Carl Zeiss Jena GmbH and DM300 million by the Jena Glaswerke GmbH, whereas the trust is responsible for DM2.74 billion and the land of Thuringia DM860 million. This project provides for the waiver of old debts amounting to DM1.35 billion, recapitalization of the firms, and the financing of social plans, including pension obligations, according to the regulations of the foundation.

Additional Measures Are Not Excluded

Should these funds prove insufficient for balancing [the books] over the next five years, the trust administration has not excluded additional measures. "Financial gaps" in the range of DM300 million could be closed if the land of Thuringia is prepared to contribute 25 percent.

At present, some 24,000 employees work at Jenoptik Carl Zeiss Jena GmbH. According to Spaeth, 2,800 people could be employed in the central facility of Jenoptik Carl Zeiss Jena GmbH, which will be taken over by Oberkochen. He sees employment for 6,700 people in Jenoptik GmbH possible if investors who bring

products with them can be found in this "unsettled atmosphere." An additional 5,000 to 6,000 workers could be employed in joint ventures that have already been established.

The former Premier of Baden-Wuerttemberg warned against leaving the Jena area with its technical and scientific potential. A large emigration would have lasting negative effects. "The management decisions at Zeiss have been made," says Spaeth, "but in terms of reorganization policy, we have enormous opportunities."

Italy's Role in European Research Programs Evaluated

91M10414 Milan *ITALIA OGGI* in Italian 19 Jun 91
p 18

[Text] Italy's role in European research has its strong points, above all in aerospace and particle physics, as well as telecommunications. The whole of Italian research does however suffer from the differences between the North and South and large and small industries. This was explained by Minister for Universities and Scientific Research, Antonio Ruberti, as he flew to the Hague to take part in the ministerial conference of the 19 countries participating in the EUREKA [European Research Coordination Agency] program. This event, the ninth of a series, and which brings the term of the Netherlands chairmanship to an end, is designed to coordinate applied research in Europe.

Ruberti went on to say that there is also a strong tendency in Italy to undertake international projects. However, Law No. 46—with 350 billion lire on funding—stipulates that only a tenth of the total resources are for joint international projects. "I have been proposing that this restriction be lifted for 18 months now," the minister explained, adding that Italy is second or third in Europe for industrial research, on the basis of either investments or the number of projects.

According to Ruberti, at the EC level there is still a certain disparity between the Italian contribution to the budget (around 15 percent of the EC total) and the EC funding allocated for Italian research which amounts to approximately 11-12 percent of the total.

Yesterday, French President Francois Mitterand (who was one of the founding members of EUREKA in Paris five years ago) delivered the formal inauguration speech in the "Ridderzaal" of the Netherlands parliament, with Queen Beatrix in attendance.

The session will review the progress of the research projects already under way for a total value of 11 trillion lire. Italy has an interest in about 15 percent of this amount, for a total of 1.75 billion lire, of which about half involves government entities. Discussions will be based on an assessment of the results achieved. The document was drawn up by the former chairman of Philips, Wisse Dekker, after an in-depth survey of the

companies involved, which were virtually unanimous in confirming the validity of the program.

The French president launched an appeal to Eastern and Central European countries, where he stressed that "all ideological barriers have been broken down," to join EUREKA, "in order to contribute their views, technologies, and skills."

"We can show the rest of the world," he added, "that European intelligence is capable both of producing and of getting organized. It is thanks to EUREKA that our continent remains at the forefront in research."

Mitterand listed the automotive, computer, waste recycling, and factory automation sectors among the areas where joint research should be developed.

About 2,500 European firms are currently taking part in 500 EUREKA projects.

Italian EC Commissioner Reviews Computer Science Policy

91MI0359 Turin MEDIA DUEMILA in Italian May 91 pp 15-25

[Interview with Filippo Maria Pandolfi, vice president of the EC Commission, by MEDIA DUEMILA: "The Major Turning-Point of European Computer Science;" first paragraph is MEDIA DUEMILA introduction]

[Text] "The EEC initiative in the computer science sector is based on two elements: First, the European Commission wishes to redefine the terms of the relationship between Europe's large internal market, the Single Act, and industry; second, the Commission believes that the traditional model of EEC research, as developed and pursued in the 1980's, cannot continue." In this interview with MEDIA DUEMILA, Filippo Maria Pandolfi, vice president of the European Commission and head of research, science, technology and computer science, outlines the plans and goals of the EEC's new approach to the computer science issues facing Europe in the 1990's. Pandolfi is also actively committed to promoting agreements among all the parties involved to define the standards for European TV via satellite and, in the future, high-definition TV. His goal is to succeed in these efforts by the end of June, while fulfilling the task of implementing EEC regulations. The EEC must also address the problems connected with frequency distribution, and its "vocation as an agreement catalyst, capable of bringing together the different interests interacting on the same market."

MEDIA DUEMILA: Why develop an initiative for the European computer science industry at this time?

Pandolfi: The traditional model which worked in the 1980's, when nobody dared speak of industrial policy, is no longer feasible in terms of the EEC's commitment to technological research and development.

Today we talk about industrial policy issues realistically, without being conditioned by languages, without trying to replace government policies with our own, but aiming at implementing the measures which are effective at the EC level.

The Commission has therefore drawn up a document—"signed" by the head of the industry department, Martin Bangemann, but in which I played a direct role—on industrial policy. The document is compatible with the domestic market and, therefore, with competitive policy-making, yet it understands the need, and exploits the room, for an industrial policy.

MEDIA DUEMILA: In the recent past, the Commission was accused of controlled planning when it tried to develop an industrial policy. Is it not laying itself open to similar attacks now?

Pandolfi: The goals of the Single Act, namely the reform of the Treaty of Rome through which the single market has been made possible, were to strengthen the industrial basis of the European Community and encourage international competitiveness. We are therefore acting within the framework of the Treaty, we are not deviating: We are using the language of the nineties, without using either controlled planning or interventionism by the EC.

MEDIA DUEMILA: Are there any similarities between the computer science initiative and the "state of crisis" of the European iron and steel industry which characterized EEC industrial action in the 1980's?

Pandolfi: The kind of action we have in mind has nothing to do with the iron and steel initiative that was based on the EEC's coal and steel treaty and called for the formal announcement of a "state of crisis" and various forms of controlled planning by the EC.

Our current reference point is the Single Act, or the EEC's Treaty of Rome, which focuses on the need to strengthen industry and support competitiveness. The computer science initiative is based on the guidelines set out in the Treaty, and this is demonstrated by the fact that it was approved unanimously by the Commission.

MEDIA DUEMILA: Are these changes in approach restricted to the twelve EEC member countries, or can they be found in other industrialized countries?

Pandolfi: The new climate is not a purely European phenomenon, but is also perceivable in the United States, where, notwithstanding some linguistic taboos, a significant change is occurring. Major federal initiatives are being launched to support industrial competitiveness while basic research programs are being supplemented with other programs for the application of the results achieved.

MEDIA DUEMILA: What has been said so far applies to the political and legal framework. But what changes will take place in the area of programs and projects?

Pandolfi: Here we are dealing with the steps taken to support research and technological development. Only a portion of the programs can still be pursued on the basis of the first-generation ESPRIT [European Strategic Program for R&D in Information Technologies] model, which had many merits, but is no longer sufficient. It is absolutely imperative to tackle large-scale projects that are closely linked to industry and industrial strategies. Big projects, mega projects, will become part of our language, implying a more selective identification of the major areas of industrial competitiveness and new methodologies. As for the practical side of the matter, due consideration will be paid to the more flexible approach adopted by EUREKA [European Research Coordination Agency] rather than the "committee science" approach pursued to date.

MEDIA DUEMILA: In which direction is European computer science expected to move in the 1990's?

Pandolfi: Some major areas have already been identified. These include information technologies, with a large-scale software engineering program designed to make up for the ground lost in this strategic area; high-performance computers; the interconnection of telecommunication networks, specifically the large-scale project aimed at developing a European neural network system, and at boosting a new demand in view of the single market. In the consumer electronics industry, a major peripherals program has been developed: no European company is capable of carrying out this kind of research alone, so the Community must act as a catalyst by combining the resources of a wide number of companies; we have been moving in this direction in other areas as well: the car industry is an example. Finally, integrated projects, which go beyond specific programs, are in the process of being developed.

MEDIA DUEMILA: In the past, the EEC relied on small and medium-size companies and university research institutes to develop and implement its research programs. The new course of action, on the other hand, seems to rely heavily on major industries.

Pandolfi: Small and medium-sized industries are the principal recipients of technological development, because they have the means to incorporate innovations into their manufacturing processes. They are therefore being asked to become somewhat less involved in innovative processes, and to better exploit innovation. What would happen to small and medium-sized industries if the European computer science industry were to collapse? We will take steps to ensure that small industries and laboratories can participate but the real problem is safeguarding the system's strongholds.

Since I come from a region in which the small and medium-sized industry culture exists, I can state that we should get rid of small and medium-sized industry rhetoric, notwithstanding their ability—which is a European speciality—to incorporate new technologies into "mature" production processes, such as in textile

industry. We have developed structural programs—such as "technological parks," or real "incubators for development" to assist geographically and industrially underdeveloped areas.

MEDIA DUEMILA: With this new approach, the computer science initiative will have to stand the test of industry and government.

Pandolfi: There is a new spirit in industry: companies are realizing that they are all structurally undersized. This means that they are willing to cooperate on the basis of synergies with the drive being provided by the EEC. Here, the Commission plays the same role as MITI in Japan, whose task is not restricted to funding research programs, but also includes acting as a link to interconnect different initiatives.

At the government level, the ministers are reacting well, while the administration agencies are resisting change. However, I trust in the persuasive force of the lesson that is implicit in everything: Even the Germans believe it is time to change.

The use of the EEC's resources and the updating of the second-generation R&D programs are to be viewed in the new framework of the Community's initiative. The ESPRIT program will also focus on new priorities, implying a radical shift in its impact.

MEDIA DUEMILA: Briefly, what are the benefits of the EEC's new computer science policy?

Pandolfi: Its ability to combine the redefinition of the EEC's industrial policy with the redefinition of the EEC's R&D activities. The result is a strategy centered on the new needs of the computer science industry. We are doing our share but industry must do its share by promoting an intelligent industrial EC policy rather than resorting to disorganized government funding which leads to greater distortions and does not favor free competition.

MEDIA DUEMILA: From computer science to television via satellite and HDTV [high definition TV]. In the last few weeks, there have been a large number of meetings. Why?

Pandolfi: The end of this year will mark the end of the 1986 directive, which made MAC standards mandatory for transmissions via satellite. In the meantime, technological development has made it possible to use medium-power satellites, such as Astra, which have been operating through the PAL system. So, while industry has invested heavily in MAC upgrading, users have invested heavily in PAL; the latter, however, is an end to itself and is bound to be replaced with the introduction of high-definition TV.

MEDIA DUEMILA: We are facing a sort of conflict between law and market. How do you plan to overcome this?

Pandolfi: I reject an abstract approach, such as laying down rules which others must adjust to. This, however, would not be possible because the EEC is not an arbitration agency determining profits and losses. Consequently, I preferred to follow a different approach: that is, consider the directive as the outcome of a final agreement among all the parties involved, covering the whole decade, rather than as an a priori statement.

A round of meetings between an advisory team and the manufacturers, the public and private broadcasters, the satellite operators, and the program developers began on 28 February.

After a first meeting, we held another meeting on 27 March, after which we decided that I should proceed with direct consultations to develop a draft proposal.

MEDIA DUEMILA: Is there a basis for a potential agreement as yet?

Pandolfi: There are elements indicating that there is a strong convergence: the driving force in this segment of the market is combining the new 16x9 domestic set—instead of the current 4x3 size—with the new MAC standard. Even the strongest PAL fans now believe that the drive toward a renewal of TV sets will stem from the application of the MAC standard to the new size.

I am trying to build the agreement, which should eventually result in a memorandum, around the binding relationship between size and standard. The agreement will then be sanctioned by the directive: the draft should be ready by 3 June.

It is an "intermediate" solution, which is bound to be discarded with the introduction of high-definition TV. It may last, however, because there is a powerful push behind it: you cannot expect people to replace their TV sets twice in a decade. The one we are planning to develop is already compatible with the 1250 lines of HDTV even though it receives only 625 and will result in a gradual replacement of household sets.

Dutch Computer Firm Director Calls for Protectionist Measures

91AN0453 Amsterdam *COMPUTABLE* in Dutch
31 May 91 p 5

[Article by Roel Mazure: "Tulip Director Calls for Support to Information Technology Industry—Hetzenauer Predicts Bleak Future"]

[Excerpt] Den Bosch—One of the announcements made by Tulip during a three-day seminar was its new PC. "Room for Productivity" is Tulip's credo, hence the large monitor of the Vision 1 PC. In his opening address, founder/director F. Hetzenauer called for EC measures to protect the European computer industry. The measures are necessary because the industry is going through bad times and the future is not rosy.

Hetzenauer predicted a bleak future for the European computer industry. "The older European computer companies are suffering great losses, and the younger companies are being bought by Japanese or U.S. firms." Tulip is said to be the last European manufacturer that has been able to remain independent. According to Hetzenauer, "not only are the companies themselves to blame, but so are the national governments and the EC, which is hardly constructive in its attitude toward the European computer industry. In many European countries, import duties are lower on computers than on parts. This is advantageous to non-European manufacturers."

According to the Tulip president, it is imperative that the EC take protectionist measures for the computer industry within the framework of Europe 92. By way of example, he mentioned the situation in the automobile industry, which is protected by import duties and quotas. Not only the computer industry, but all of European industry would benefit by such measures, "because the electronics industry is increasingly becoming the basis of all other industries," said Hetzenauer.

Differences in taxes among the European countries should be eliminated, according to Hetzenauer. He mentioned Ireland as an example of a country where the establishment of manufacturing plants is made attractive by a low sales tax. Hetzenauer said that more than 30 non-European computer manufacturers have already set up their business in Ireland. Tulip, too, is considering setting up an assembly plant in Ireland, but has postponed that decision for the time being. [passage omitted]

CORPORATE ALLIANCES

European Manufacturing Industry Alliances Formed

91WS0422C Paris *INDUSTRIES ET TECHNIQUES*
in French 14 Jun 91 p 16

[Article by Mirel Scherer: "The European Lathe Industry Restructures: The Regroupings Around the German Firm Traub and the Swiss Company Tornos Bechler Continue"]

[Text] Big maneuvers are underway in the European lathe industry in anticipation of the large market. The German company Traub, which took over Sonim in 1989, has announced its acquisition of the Italian manufacturer of machining centers, Gloria. "Our goal is to offer users a complete line of machines," says Nicolas Priore, director of Traub France. That meant that a tool capable of machining cubic parts, such as the Gloria TVC 200/300/400 machining center, had to be added

A Strategy to Prepare Europe 1993

Indeed, in putting together a flexible machining unit, the Gloria machine is an important complement to the MultiCenter TMC 250 lathing and milling center offered by Traub.

Likewise, Tornos Bechler's announced acquisition of FLD Manurhin is strategic. Indeed, the Swiss specialist in screw-cutting machines, which acquired the French company Wirth and Gruffat in 1989, is now the top European manufacturer in its specialty. The figures tell the story: the new company employs 1,400 people, has turnover of 1.4 billion French francs [Fr] through the sale of over 1,200 machines a year, and has total installed stock of 120,000 machines. "Europe 1993 and the imminent arrival of Japanese manufacturers force us to consider this type of external growth," explains Michel Suchet, administrator of the Tornos Bechler group. "Our top-of-the-line multispindle machines are bolstered by FLD's bottom-of-the-line single spindles in answer to the Asian threat."

The biggest of the Japanese makers of automatic lathes and screw-cutting machines have manufacturing capabilities of 1,500 machines a year. They now export only 25 percent of their production. "But what will they do tomorrow?", wonders Michel Suchet. Technically, the union is a response to an autolathe market that is in the midst of a revolution. "Highly sophisticated, high-precision screw-cutting-machine-produced parts are now used in many industries: automaking, electronics, aeronautics and space, medical, etc. Manufacturers must produce high-precision parts on increasingly automated and high-performing machines," Michel Suchet analyzes.

For FLD Manurhin, the inventor of the K'MX system, the alliance was inevitable. "Even with sales that tripled in five years, we cannot resist a Japanese competitor, with five times as much productive capacity and R&D potential," affirms Gilbert Fischer, the CEO [chief executive officer] of FLD. "We do not want to disappear—as have many small and medium businesses without foresight—in the anguish of price wars and other technological adventures." Especially since David has a lot to offer Goliath (Tornos is four times the size of FLD). In addition to its innovative ability, FLD has a production plant in the United States that will make certain Tornos Bechler machines starting in January of 1993.

For the latter, the yearly screw-cutting machine market has grown to 100,000 units in Europe and 120,000 in the United States.

European Companies Build Plastics Recycling Factory

91WS04141 *Toddington NEW MATERIALS INTERNATIONAL in English May 91 p 2*

[Text] Four European companies are collaborating to build a factory to recycle plastics from old cars. They are

the Dutch company DSM, the German firm BASF, and the French companies Cray Valley and Saint-Gobain.

Scheduled to start operating in October, the factory sited near Karlsruhe will convert automotive plastic into a powder which will be reused as reinforcement in the fabrication of glass fibre composite materials.

The partners formed a company called Ercom to operate the new plant. It will invest FFr22m in the project between now and 1992, of which 60% is for the construction of the factory and the development of the logistics organisation to collect the plastic waste material. The rest of the investment will go towards research into methods of using the end-product.

From 1993 onwards, Ercom expects to be able to produce 4,500 tonnes of the product annually.

Possible Philips, Siemens, Thomson IC Manufacturing Merger Debated

91AN0417 *Paris ZERO UN INFORMATIQUE in French 10 May 91 pp 1, 3*

[Article by Philippe Guichardaz: "Semiconductors: Europeans Reject 'Eurochip' Idea"]

[Text] Manufacturers are still not warming to the idea of a total merger between the three major European chip makers but are open to cooperation agreements.

While semiconductors are becoming key elements in manufacturing and in the cost price of computer and telecommunications equipment, the markets for these are increasingly dominated by Japanese industry for memory chips and by American industry for microprocessor chips. In view of these near-monopoly situations, European firms control only 10.5 percent of world semiconductor sales, compared to 25 percent 15 years ago, and they are experiencing heavy losses in the field. "Problems in the European information technology sector resulted in the EC authorities and national governments becoming aware of the situation in the semiconductors industry," said Claude Marechal, Motorola managing director for southern Europe.

The seriousness of the situation has effectively alarmed the Commission of the European Communities. To such an extent that Filippo Pandolfi, its vice president, made the following straightforward statement at a recent conference: "Philips, Siemens, and SGS-Thomson must understand that Europe needs a single manufacturer in the semiconductor sector." Nonetheless, it must be admitted that not only chip manufacturers but also chip users are proving very skeptical about the expediency of such a merger into a "Eurochip Inc." concern.

Henk Appelo, a member of Philips' board of directors, at last week's presentation of the group's quarterly results said that it was "too soon" to discuss this kind of operation which, in any case, is "not necessary" and would even be "pointless." And he drove his point home

by mentioning the failure of the Unidata project in the 1960s. According to analyst Bernard Warusfel, "the merger would come at a time when Philips seems to be shedding its components activities. This would make it a weak link and would oblige it to invest money in the adventure."

When interviewed by ZERO UN INFORMATIQUE, Siemens said that Filippo Pandolfi was only expressing his personal opinion and that Siemens was "not very favorable" to the creation of a single European semiconductor firm. At SGS-Thomson, the tone was slightly more measured. Its CEO [chief executive officer], Pasquale Pistorio, who heard Filippo Pandolfi's speech, concurred with the latter, but he would rather give preference to "any form of possible association" with Philips and Siemens.

Georges Grumberg, director of future planning and European cooperation at Bull, feels that "if we speak of a single company, the exact market in which it should operate would have to be identified. For certain kinds of integrated circuits, the European market can accept more than one manufacturer."

On the subject of memory chips, he added: "We want to avoid monopoly situations and the formation of cartels among manufacturers, but it is not our job to make decisions on behalf of the manufacturers concerned. Nevertheless, in the field of microprocessors, we are ready to cooperate on developments with European manufacturers."

However, although Philips and Siemens are apparently opposing the hypothesis of a merger, they do not seem to be completely against other forms of intra-European cooperation, and with reason. On the one hand, the different national governments have become aware of the importance of semiconductors for the whole of European industry and not only for the computer industry. It has become a highly strategic area today. On the other hand, in the face of the Japanese champions—who control nearly half the world's semiconductor sales—Philips, SGS-Thomson, and Siemens (ranking 10th, 12th, and 14th among world manufacturers, respectively) have still not attained the crucial threshold of 5 percent of the world market.

The Japanese market, however, remains practically closed to European chips.

However, reaching the critical size will be vital if the three European companies intend continuing the investments necessary to their survival in this sector. A total of about \$20 billion (R&D, construction of factories) will be needed between now and the year 2000, according to some analysts. "To build a plant with a 0.35-micron production line would cost at least \$1 billion," Claude Marechal reckons.

Future investment efforts may become particularly difficult to sustain at a time when the three manufacturers are in the red. SGS-Thomson lost \$100 million last year

while Philips and Siemens spoke about "major losses" without specifying the exact amount. So, Lone Ranger strategies are no longer possible. "Fortunately for Europe, Siemens has lost a lot of money this year and should continue doing so for at least another 3 years if things remain the same. That should make them think," said a top-ranking American executive.

Incorporated as a single company, the three European firms would hold between 7 and 9 percent of the world market. However, such a merger would imply considerable streamlining in terms of staff and production sites. "This would give rise to even more disputes within the new entity than in relation to competitors," one of the directors of an American chip manufacturer retorted. And he added: "Furthermore, this Eurochip would logically be operating alone in the semiconductor market. Not very many companies positioned alone in this market have survived. Japanese manufacturers, for instance, all belong to highly integrated groups."

Pietro Martinotti, director of strategic planning at SGS-Thomson, emphasizes that "a merger is possible but not obligatory. Two other types of alliances are possible, notably in R&D and in semiconductor production technologies." This opinion is shared by an executive in charge of semiconductor production with an American computer manufacturer: "The development, the equipment, and especially the manufacturing processes must be identical. If the Europeans dominate the 0.5-micron line, they could from there switch to any product." As for the number of production lines, the Europeans "could consider having two lines for three manufacturers, for example, all depending on the market in question."

However, the French authorities, anticipating the reluctance by Siemens and Philips to any idea of a merger, seem to be opting for technological cooperation. "The rapprochement of companies does not necessarily mean a merger; it can also involve a pooling of research programs or the establishment of common standards," said French Minister of Industry Roger Fauroux, during the latest European Council on 29 April. "After the development of such a common technological core, commercial agreements could be concluded per product on a case by case basis," it is said in ministerial circles, where it is hoped that decisions will be made "before the end of the year."

However, apart from calculated political speeches, national and EC authorities should also give clear commitments on the financial backing they are willing to put into the European semiconductor industry. This is not the case at present. The Commission in Brussels, which pledged funding to the Joint European Submicron Silicon Initiative (JESSI) to the tune of 20 percent, has not come up with its contribution, and the German Government has just frozen Fr170 million in subsidies. In France, two programs aiming to develop new generations of semiconductors are still awaiting funding. "How many billion dollars is the French Government willing to hand out over the next 5 years? This would be a serious

basis for discussion. For the moment, the amounts in question are only peanuts in relation to requirements in the field," a French manufacturer stresses. "Europe must understand that the financial effort to be made is phenomenal if it wants to hold on to its chips industry," Claude Marechal insists.

Thomson CSF, GEC Ferranti Conclude Radar Alliance

91AN0466 Paris *ELECTRONIQUE INTERNATIONALE* HEBDO in French 6 Jun 91 p 8

[Article signed P.A.: "GEC-Thomson CSF Alliance for Airborne Active Antennas"]

[Text] The active electronic scanning antenna will be the cornerstone in the airborne radars of future combat aircraft. In the face of the competition, a European alliance is a necessity.

Active electronic scanning antennas, which will presumably be fitted on combat aircraft as of the end of the century, would today cost more than 20 million French francs [Fr], at the very least. The development of the technology requires, however, substantial R&D efforts. To stay in the race, the Europeans have only one possibility left—alliance. This awareness has induced yesterday's enemies to make common cause. Thomson CSF and GEC-Marconi have thus recently established a European economic interest group called "GEC Thomson Airborne Radar," held by the two companies in equal proportions, responsible for developing active antennas for new-generation combat aircraft and for modernizing those of existing aircraft.

React to the American and Japanese Advance

An active antenna is an electronic scanning antenna. This type of antenna includes a large number of radiating transmitter-receiver modules (generally, more than 1,000) based on microwave monolithic integrated circuit (MMIC) technology. Each of them is fed directly by its own transistor-based power amplifier preceded by a controlled low-level phase shifter that alters the phase of a microwave reference signal distributed identically to all the modules. An individual module costs no mere pittance—estimated today at a minimum of Fr20,000. Investment required to manufacture it at an acceptable cost would amount to several billion francs. The U.S. company Texas Instruments, with broad funding support by the U.S. Army, is the industrial firm that is the furthest advanced in this area. It is the Texas Instrument-Westinghouse partnership, moreover, that has been selected to develop the active antenna radar for the Advanced Tactical Fighter (ATF) for which the production phase should begin in 1996. For the electronic scanning radar of the Rafale, the RBE2, Thomson CSF—together with Dassault Electronique—is currently engaged in an intermediary stage—a passive antenna that uses a single power amplifier.

At the European level, in order to react to the American and Japanese advance in the area of on-board active antennas (in this case, Mitsubishi which has received technology from Westinghouse in connection with the development of the Japanese fighter aircraft, the FSX), the essential issue is the search for critical size. Thomson CSF adopted this strategy about two years ago, when it began discussions with Ferranti and then attempted to take over the British firm. These agreements were more or less overshadowed by the takeover of Ferranti's defense activities by GEC, another British firm, in February 1990. This reorganization of British defense electronics was also the occasion to put an end to the politico-technological imbroglio surrounding the radar for the European Fighter Aircraft (EFA), the rival of the French Rafale. Then there were discussions that pitted the "European Collaborative Radar for the 1990s" or ECR-90 consortium (Ferranti, Siemens, Fiat, and Inisel) against MSD-2000 (Daimler-Benz and GEC). Ultimately, it was GEC which was designated to head up the ECR-90 program for the EFA.

Necessity knows no laws: In order to face up to competition—which is expected to be harsh and arduous—for the radars of the end-of-century combat aircraft (the Rafale of which the air force is expected to order 250, and the EFA will both go into production around 1996-1997), Thomson CSF and GEC-Marconi have finally agreed to join forces. For Thomson CSF, this Franco-British affiliation occurred two and a half months after the breakdown of the Eurodynamics project with British Aerospace to merge the missile activities of the two companies. GEC-Marconi has, moreover, already teamed up with Dassault Electronique in the areas of electromagnetic missile homing devices and electromagnetic antimissile decoys.

Thomson, SGS-Thomson Subsidiaries Form Semiconductor Joint Venture

91WS0410A Paris *LE MONDE* in French 18 Jun 91 p 38

[Article: "Thomson Forms Partnership for HDTV [High-Definition Television] Components"]

[Text] Following the example of Japanese firms, Thomson Consumer Electronics (TCE), the Thomson group's mass-market electronics subsidiary, has decided to form a partnership with SGS-Thomson Microelectronics, Europe's second largest maker of semiconductors, whose capital is divided 50-50 between the parent company and the Italian group IRI-Finmeccanica. TCE and SGS-Thomson have decided to embark as of 1 July on creation of a joint center for semiconductor development. The new company will be called Thomson Consumer Electronic Components (TCEC). The purpose: to better integrate the design of consumer electronics products with semiconductor design. Creation of this new center will allow TCE to reduce the cost and time needed to develop its products. The research accord is coupled with a chip supply arrangement. SGS presently covers 9

percent of TCE's needs in this area (\$280 million altogether). Mr. Isautier hopes that by 1995 SGS will be meeting 50 percent of the company's needs (projected to amount to \$500 million by that time).

Eureka Opens Membership to East European Countries

91WS0410C Paris LE MONDE in French 20 Jun 91 p 31

[Article by Christian Chartier: "East European Countries Invited to Join Eureka"]

[Text] The Hague—In a meeting at The Hague on Wednesday 19 June, responsible ministers from the 19 member countries of the Eureka European research program adopted a declaration inviting the countries of East Europe to join them in broadening what Mr. Francois Mitterrand has called "the domain of European research and technology."

HDTV [High-Definition Television]

Except for Yugoslavia, which is already a full-fledged member, East Europe's involvement with Eureka is limited for the moment to the participation of a few research centers in a small number of projects. The declaration at The Hague invites the former Communist countries "to designate a Eureka correspondent, a point of contact responsible for circulating information in both directions," as we were informed on Tuesday 18 June by Mr. Serge Gregory, program coordinator for France.

In remarks on Tuesday 18 June commemorating the fifth anniversary of the launching of Eureka, Mr. Mitterrand held out his hand to the countries of East Europe: "The 'Wall' has fallen: Let all of them (the East European countries) come in. No one is excluded." In an apparent allusion to the very recent meetings of the European Confederation in Prague, Mr. Mitterrand concluded: "Creation of the European continent—that is what I expect from the next stage."

The president said nothing about high definition television, the other hot issue at the meeting in The Hague, an issue which, as it turns out, was not definitively resolved. In a joint statement, the 19 members said "the HD Mac [High-Definition Multiplexed Analog Component] standard is the final objective." But D2 Mac was not designated explicitly as the mandatory intermediate standard.

However, France is satisfied: While the joint statement "alludes to D2 Mac," it also makes utilization of that standard unavoidable for satellite broadcasting and cable television. And, according to Mr. Jean-Baptiste Sejourne, technology representative for the Ministry of Industry, "it makes reference to the 16/9 format, which can only be transmitted using the D2 Mac standard."

So Paris feels "the best possible compromise was reached," according to Mr. Didier Holleaux, an adviser

to the minister of research. A compromise which it is hoped will spur the Brussels Commission "to go further."

Italian Companies Form Advanced Robotics Consortium

91MI0352 Milan ITALIA OGGI in Italian 22 May 91 p 18

[Text] Ansaldo and Elsag Bailey (both companies of the IRI/Finmeccanica [Institute for the Reconstruction of Industry/Mechanical Engineering Finance Corporation] group), always at the forefront in the sector of advanced robotics and remote-control manipulators, have recently established the Telerobot consortium.

The new industrial venture, which is located in Genoa, combines the expertise of the two companies in the fields of remote manipulation and intelligent sensory systems and is oriented toward research and development. Its declared objectives are to develop and market advanced and service robots designed to operate in environments that are hostile to man. This field includes all those devices that are remotely controlled by an operator, possess a certain degree of autonomy, and can carry out operations in harmful or dangerous environments or places that are difficult to access.

Ever since its establishment, Telerobot has had substantial technological expertise at its disposal thanks to the experience of its partners. Of particular note are the Mascot IV remote-control manipulation system and the SMT remote-control mobile platform that can be outfitted with robotic arms.

The Mascot system, designed and developed under an ENEA [National Committee for the Research and Development of Nuclear and Alternative Energies] program, is among the most advanced in the world. With its two manipulators, complex operations can be performed with a very high degree of dexterity and a sensitivity superior to that of man. Mascot has been regularly used in many research centers in addition to ENEA, among which CERN [European Nuclear Research Center] in Geneva and JET (Joint European Torus) in the UK, for many years now.

The SMT platform may, instead, become the leader of a new generation of mobile robots designed to substitute human beings in particularly dangerous missions such as the manipulation and activation of explosive materials, antiterrorist controls and non-destructive inspections, thanks to X-ray incorporated devices, or in collecting samples and materials in hostile environments, such as on the Moon.

Both Ansaldo and Elsag are involved in national and international programs, particularly in the ESPRIT [European Strategic Program for Research and Development in Information Technologies] projects for the development of artificial vision systems applied to mobile robotics and the EUREKA [European Research

Coordination Agency] projects for the development of civil defense mobile platforms. The research programs on underwater robotized systems for inspection, maintenance, and retrieval operations are also of particular importance.

There is a certain reserve over the consortium's future programs, even if the initiation of collaboration with the Italian Space Agency appears certain.

Vulcain Engine Passes 600-Second Mark

91WS0410B Paris LE MONDE in French 18 Jun 91
p 40

[Article by Jean-Francois Augereau: "First Extended-Duration Test of Vulcain Engine"]

[Text] Europe's Ariane-5 rocket program has made it past an important hurdle with the successful test of its Vulcain engine at European Propulsion Company [SEP] facilities in Vernon (Eure) (see LE MONDE, 16-17 June). For the first time, the engine was tested for 600 seconds, the total firing time necessary to launch the European Space Agency's new heavy satellite rocket in April 1995.

Ariane-5 program officials are especially pleased with this successful firing, since previous tests had been marred by various malfunctions. One of them had led to the actual "crumpling"—like a sheet of paper—of the diffuser nozzle in the lower part of the engine. Another test, performed in Germany, was interrupted during the launch sequence just 15 seconds after ignition. Yet another, at Vernon on 5 June, was aborted after 182 seconds owing to mechanical problems with several temperature sensors.

All this amounts to saying it is not easy to develop this kind of cryogenic engine, which burns about a tonne of fuel (propellant) every four seconds. The power of one of the turbopumps that make possible such performance is almost 12 megawatts, nearly twice the power needed to pull one of TGV Sud-Est's high-speed trains. With more than 100 tonnes of thrust, Vulcain far and away eclipses its predecessor, the HM-7 cryogenic engine (six tonnes of thrust) which powers the Ariane-4 third stage. So it should come as no surprise that 8 billion French francs [Fr]—just over one-fourth the total (Fr28.7 billion) earmarked for the Ariane 5 program—has been set aside for Vulcain's development.

CORPORATE STRATEGIES

Ericsson CEO Calls For Euro-American Cooperation

91AN0475 Paris ELECTRONIQUE INTERNATIONAL HEBDO in French 13 Jun 91 p 3

[Interview with Lars Ramqvist, CEO of LM Ericsson, by Kenneth Dreyfack: "Efficient Cooperation Is Not Necessarily Inter-European Cooperation"; first paragraph is ELECTRONIQUE INTERNATIONAL HEBDO introduction]

[Text] Semiconductors have great strategic value. According to Lars Ramqvist, president and chief executive officer of LM Ericsson, whoever controls the world semiconductor industry would control the world electronics industry.

ELECTRONIQUE INTERNATIONAL HEBDO: The European semiconductor industry has progressively lost its market share. Should we be worried?

Ramqvist: Obviously there is considerable anxiety in Europe, and with good reason. If Europe drops out of the semiconductor race, it will no longer be capable of designing electronic equipment. The root of the problem is the fact that Europe has not succeeded in setting up efficient cooperation arrangements. Suddenly it is behind the Japanese and Americans. Today, however, even the White House is worried about the way America is lagging behind Japan. There is no miracle solution.

It should also be emphasized that the problem does not only affect semiconductor technology; design tools must be controlled as well as integrated circuit manufacturing equipment. We are talking about an interrelated industry.

Whoever controls the world semiconductor industry would control the world electronics industry.

ELECTRONIQUE INTERNATIONAL HEBDO: How can Europe obtain the necessary resources to develop and manufacture semiconductors and make up the ground it has lost in this field?

Ramqvist: With this lost ground in mind, we at Ericsson cannot claim to be ensuring the development which the whole of Europe is not able to achieve. This is why we established, in 1987, our alliance with an American semiconductor manufacturer, Texas Instruments, which is a leader and one of the few manufacturers able to stand up to the Japanese. Thanks to this alliance, we have solved the problem within our own company.

We are not taking a position on the solution to this problem on a European scale. It is clear, however, that a purely European approach has never really worked. A merger between SGS-Thomson, Siemens and Philips is not the best solution. It will perhaps be necessary to cooperate with an American manufacturer. TI could, for example, reinforce Europe's strong points, and I believe that discussions are taking place with this in mind.

ELECTRONIQUE INTERNATIONAL HEBDO: Are not some people recommending protectionist measures to create a temporarily sheltered zone?

Ramqvist: The aim of the GATT is to eliminate barriers. And the whole history of Ericsson is built on successes achieved in foreign markets. Obviously I am in favor of "free trade." However, it is possible that barriers may be set up in Europe. This is why I think that the main threat for LM Ericsson during this decade will be of a political nature.

ELECTRONIQUE INTERNATIONAL HEBDO: What will be the consequences for Ericsson of Sweden's possible accession to the European Community?

Ramqvist: Sweden should become a member of the EC. We have informed our government that if this does not occur, Ericsson will behave as if it is an EC-based company. We are ready. We could move our headquarters without any difficulty. However, we are already present in the member states today. Through our subsidiaries, we are taking part in the Research in Advanced Communications for Europe (RACE) projects and in others. Nearly 60 percent of our revenue comes from the EC.

ELECTRONIQUE INTERNATIONAL HEBDO: Out of all the major industrial sectors in the electronics industry, only telecommunications is doing reasonably well in Europe. Why?

Ramqvist: Historically, the telecommunications sectors in the United States and Japan have always been closely linked to their domestic markets. Few initiatives have been taken abroad. The favorable position of European manufacturers is the result of both these historical facts and good strategic choices. Can the Europeans count on the continuation of this situation during the 1990s? Nothing is less certain. The companies formed after the breakup of AT&T have know-how and resources. The takeover by AT&T of the whole of its former hybrid company with Philips is only one example, among others. Moreover, these companies can rely on the considerable political weight of the United States. The Japanese, for their part, now have better skills and more power than before. Europe's leading position in telecommunications is far from assured.

Denmark's Novo Nordisk Plans Expansion

91MI0316 Duesseldorf *HANDELSBLATT* in German
30 Apr 91 p 19

[Text] The Danish biotechnology concern, Bagsvaerd-based Novo Nordisk, which is the product of the merger two years ago between Nova and Nordisk Gentofte, is looking out for profitable acquisitions worldwide. The board of directors has been authorized by the shareholders' meeting to purchase acquisitions up to 1.5 billion Danish kroner [Dkr] to be financed via a new share issue; an exchange of shares might also be contemplated.

Novo Nordisk says officially that no concrete proposals have been tabled. However, board chairman Mads Oelivsen says it is important to have liquidity available at short notice whenever a favorable chance presents itself. And that is just what the company has, with Dkr3 billion cash assets even prior to the proceeds from a share issue. Oelivsen says: "We want to save having to ask the bank first."

Novo Nordisk increased its sales last year by 10 percent to Dkr8.066 billion; pretax profits rose by 8.5 percent to Dkr1.13 billion, although after taxes there was an

increase of just 1.9 percent to Dkr760 million. The reasons for the discrepancy between the profit growth rates are not expressly stated, although they may have something to do with the legal right to defer part of profits tax-free on a temporary basis. The company probably availed itself of this right in previous years. The dividend is about 20 percent; the workforce has risen by 648 to 8,742, three-quarters being employed in Denmark.

The two pillars of the company are the pharmaceuticals (primarily insulin) and industrial enzymes divisions. Novo Nordisk holds about 40 percent of the world market for insulin products in the face of stiff competition from the American concern Eli Lilly. It is especially in this area that the developments in eastern Europe have opened up new prospects. Although they had formerly been comparatively stable, last year saw a 19 percent increase in sales, to which eastern Europe, including the Soviet Union, had clearly contributed. Eastern Europe now looms large in the company's sales planning.

Exchange rate trends last year did not favor the Danes, 80 percent of whose sales are made in foreign currency, primarily dollars. The weakness of the American currency last year keeps the trend down, when it is converted into Danish kroner. In the respective foreign currencies, sales would show an 18 percent increase, calculate the company's economists. It is also annoying that this trend has given Eli Lilly the competitive edge. This year, however, it will probably not be repeated, although Novo Nordisk does not yet venture a forecast.

They are waiting with some optimism for the introduction of a new enzyme for detergents, Lipolase, to produce an impact. It presents the desired grease-cutting properties, but at temperatures lower than the previous norm. It has meanwhile passed acceptance tests at important detergent manufacturers such as Unilever. Its dual advantage lies in the lower wear on fabrics during washing and in the reduced power costs attributable to lower washing temperatures, Novo Nordisk stresses. The enzyme was discovered by chance, so to speak, during genetic engineering experiments; the Danes believe that it gives them a considerable lead over the international competition.

Novo Nordisk likes to draw attention to its own significance for the national economy: 12 percent of Denmark's private research and development is carried out within the company for an equivalent of Dkr1.2 billion. Conservative premier Poul Schluter therefore likes to refer to the company as an "exemplary locomotive," and his finance minister, Henning Dyremose, is a former Novo board member.

Novo Nordisk itself is, by definition, not a candidate for acquisition. The share capital is structured in such a way that 68 percent of the voting rights are currently controlled by a foundation, and this majority will also be maintained after any increase in capital. The chairman

of the supervisory board, Vagn Anderson, nevertheless describes the company's shares as attractive, as the company's stock-exchange value has risen by about 33 percent to more than Dkr13 billion since the merger.

An important line of development at Novo is research into the role of microorganisms in the production of enzymes; the researchers do not stay in the laboratory but seek out nontraditional or "exotic" development environments such as hot springs or animal excrement. One attractive area of application might be environment-friendly pest control agents.

But this should merely be a transitional phase, as in five years' time practically all enzymes will be produced by genetically manipulated microorganisms, says Boerge Diderichsen, head of the genetic engineering department. The company thus intends to maintain its position as "the world's biggest producer of industrial enzymes."

The company's insulin research strategies aim to obtain preparations with rapid subcutaneous absorption and organ-effect differentiation, a specific effect on the liver being sought. In the liver, insulin concentrations are important for optimum blood glucose control. On a somewhat longer-term basis, analogous products are being developed that will be taken as tablets or drunk in liquid form, thus dispensing with injections. The international race is on among researchers in this field, and the Danes' intention to strengthen their capital and liquidity basis is obviously aimed at achieving a leading position.

France: Canon CEO on European Strategy

91AN0479 Paris ENTREPRISES & TELECOMMUNICATIONS in French Jun-Jul-Aug 91 pp 90-93

[Interview with Takenori Matsuoka, chairman of Canon France, by Herve Marchal: "Growth Has Become a Mania"; first paragraph is ENTREPRISES & TELECOMMUNICATIONS introduction]

[Text] France is Canon's number one market in Europe, and Europe is its number one in the world market. This illustrates the importance of the Old World—and our country—to the Japanese firm's strategy. This firm has an enviable growth rate: a 450-percent increase in revenues over the last 10 years. And this is just the beginning. The objective henceforth is to multiply revenues by a factor of five and double the number of personnel between now and 1995. To achieve this, a further effort will be made in research and development, the telecommunications challenge will be taken up and, above all, the burning issue of internationalization will be tackled. Even if this means paying the ultimate price: diluting the distinctive Japanese character of the company.

ENTREPRISES & TELECOMMUNICATIONS: Is the strategy of Canon France specific to France or is it part of a wider European strategy?

Matsuoka: The objective of Canon France, of which I am chairman, is not specific to France. Our aim has always been to contribute to the development of the country in which we are established. The general policy of the group today, which was determined recently, is to reach a 15-percent annual growth rate. This means that we will try to double our revenues in five years. However, with empty hands, this will be impossible even if a market does exist. In other words, without our products and technology, we will not be able to achieve this. But I am confident because the directorate of research and development (R&D) is going to help us sustain our normal, standard growth rate enabling us to maintain our development. This is of utmost importance.

ENTREPRISES & TELECOMMUNICATIONS: You mentioned R&D; about a year ago, Canon France laid the foundation stone for a research and development center in Rennes. How is this center developing, what fields will it be working in, and how many researchers will it have?

Matsuoka: The group has a major philosophy: the philosophy of globalization. To appreciate Canon in its totality, its three main activities—R&D, manufacturing, and marketing—must be considered. We would like, over the long term, for all our products sold in Europe to be developed and manufactured there. France is, furthermore, the first country in Europe where our three activities have been combined. Our first, purely marketing, operation started up in 1975; then, in 1983, we launched the Liffre plant in Brittany; and at the end of 1990, the research center in Rennes. This last operation is, considering our global policy, something we see as being essential. We are happy that the main orientation of the center is telecommunications, because this field is highly developed in France. As for recruitment, this will be rapid: about 100 engineers in three years. So I am happy to be able to tell our marketing people that we will soon be selling products developed in France.

ENTREPRISES & TELECOMMUNICATIONS: Are these researchers recruited from the European market or throughout the world?

Matsuoka: Canon chose the Rennes Atalante site because it is an area rich in human resources, with universities and colleges where engineers are relatively easy to find. But this center, the second of its kind in Europe, is called Canon Information Systems R&D Europa, which means that it has a European, and not a purely French, dimension. Furthermore, all products manufactured in Brittany are destined for the whole of Europe. Therefore, recruitment will be European.

ENTREPRISES & TELECOMMUNICATIONS: In what telecommunications sectors will the center concentrate its activities?

Matsuoka: In our business when we talk about telecommunications we are talking, first and foremost, about fax machines. But very few boundaries exist between our

products. For instance, our laser color copier is a photocopier with enormous potential for interconnection with microcomputers, PCs. The same goes for fax machines. There are endless possibilities for communication with other computerized office equipment. Let us say that our main focal point will be the future fax machine applied to the world of office technology.

ENTREPRISES & TELECOMMUNICATIONS: Do you envisage new products being developed at this research center?

Matsuoka: Of course, this is our main objective. We are carrying out operational research and development there.

ENTREPRISES & TELECOMMUNICATIONS: On the basis of information provided by your group, over two years ago, the staff in the Liffre plant in Brittany was working harder than the staff in Germany; as hard as the staff in Japan; and nevertheless, was paid much less. How can you explain these differences?

Matsuoka: The local context is taken into consideration, in this case, the average salary level for this kind of activity in Brittany. In any case, for France, it is more logical to take salary levels existing in Brittany as a basis rather than those existing in Germany. I would add that there is nothing comparable in Germany to the French system of participation.

ENTREPRISES & TELECOMMUNICATIONS: Are you satisfied with your staff?

Matsuoka: Absolutely.

ENTREPRISES & TELECOMMUNICATIONS: Do you have plans for growth abroad?

Matsuoka: Why not? We do not want to hold back from cooperating with French or European companies. It all depends on the field in question, on our priorities, and those of our partner. There are a certain number of examples of this: a joint venture with Olivetti in Italy; Canon Inc. has an agreement with Siemens in Germany concerning the PABX (we distribute Siemens' line of Saturn automatic exchanges in Japan). But we have no new projects in France for the moment.

ENTREPRISES & TELECOMMUNICATIONS: Don't you control the activities of the small French manufacturer Tetras?

Matsuoka: Yes, Canon Inc. Tokyo has a 19-percent stake in this photocopier company. But I believe that this company is developing from marketing to manufacturing only. There are no plans for a major cooperation with it. The main business remains focused on manufacturing.

ENTREPRISES & TELECOMMUNICATIONS: The European Community accused you of dumping and levied a tax on you five years ago. Does this stricture still apply?

Matsuoka: This represents a tax of 20 percent over and above the price for certain photocopy products. This penalty is still in force. I hope that it will be lifted soon. But this is not the fundamental problem. I believe that this antidumping measure is fairly typical. It is a symbol of protectionism. Canon and a certain number of Japanese manufacturers exported finished products to other countries. It is true that they won over these markets. But Canon has a very clear policy. It is not our intention to make money on external markets and then to transfer the profits to Japan. We have never done that. We want to maintain our presence in France. Furthermore, I am working for France and this motivates me a great deal. I want to be a foreigner who is working for your country. Canon has, for nearly five years now, manufactured several lines of photocopier products in Europe and the United States, outside Japan. In my opinion, this is no dumping but the essence of Canon's policy. At that time, and purely by chance, we were fined and our point of view was not given full consideration, but our policies are very clear today.

ENTREPRISES & TELECOMMUNICATIONS: How can you explain the price differences between the European market and the Japanese market?

Matsuoka: Our position is not that there was 20 percent dumping. We fully explained our point of view, but this resulted in our being fined. That is history. What we want now is to progress. Today, we have no product that can be the object of dumping. In effect, we do import laser color photocopiers but these are very high-technology products and are not included in antidumping legislation. We have always wanted to increase the manufacture of products sold in Europe.

ENTREPRISES & TELECOMMUNICATIONS: Are products which are made in Europe exported elsewhere in the world?

Matsuoka: They are intended for different European countries and, during a subsequent phase, for the whole world.

ENTREPRISES & TELECOMMUNICATIONS: What percentage of the Liffre plant's production is exported within Europe?

Matsuoka: Roughly 20 to 25 percent of the products are sold in the French market, the remaining 80 percent is exported to other European countries.

ENTREPRISES & TELECOMMUNICATIONS: You have decided to strengthen your operations in the United States, notably for software production.

Matsuoka: We have a research center there dealing in software for computers and peripherals. And we have set up a telephony unit there recently. On a more global level, we have several transfer projects for certain activities. Full-fledged divisions will be transferred out of Japan. We need to do this to develop our technologies.

This is one of the main reasons the development, planning, and marketing department of the typewriter division is being moved to the United States.

This is a good example of the principle of decentralization. I believe that we are trying to move to countries most advanced in each field. Canon has fully understood that to become a worldwide leader in a given field, it is necessary to seek skills in countries where they exist. This is why we also created a research center in Australia a short while ago. We try, in each case, to match the culture and technical progress of each country.

ENTREPRISES & TELECOMMUNICATIONS: So far we have not been able to speak of a major Canon breakthrough in computer equipment. How can you explain this?

Matsuoka: We sell a certain number of PCs—the central component of computerized office equipment—and perhaps we are not as well known as Macintosh. It is true, too, that Canon has no intention of venturing as far into this field as Apple or IBM. Our policy lies more in the development of a very wide range of computerized office equipment, although in France over 50 percent of our business comes from photocopiers. In fact, Canon has a piecemeal approach. This system enables us to have a foot in every door permanently. We now want to give priority to software because we are aware of its importance. Our president's policy is to have hardware in our right hand and software in our left.

ENTREPRISES & TELECOMMUNICATIONS: What are the requirements of enterprises going to be over the next 10 years in terms of telecommunications and computerized office equipment? What types of products will need to be developed?

Matsuoka: In our business, no one is able to predict the next generation of office technology products. There are many products nowadays that were not even planned five or 10 years ago. There are many opportunities for innovation and I have no idea of the latest. But there are a certain number of significant parameters which help understand where we are heading, for example the personal systems market. When we talk about office automation, we increasingly talk about personal office products such as the personal laser color copier, the personal fax, and the personal telephone. The second significant factor is the systems approach. Canon is investing a great deal to ensure that systems are compatible, that products can be interconnected and communicate with each other. In other words, interfaces and software are the mainstays.

ENTREPRISES & TELECOMMUNICATIONS: Do you think that the senior executive is going to use all this computerized office equipment personally, or is it essentially going to be used by assistants, secretaries, or junior executives?

Matsuoka: I think that progress is less rapid than expected for the simple reason that these products are

still too sophisticated and directors do not have the time to work with the machines and learn the technicalities. This must all be made more simple. The use of vocal commands is going to facilitate things greatly and make operations much easier. But I am skeptical. The executive occasionally uses a typewriter, the photocopier, and, from time to time, sends faxes. It is, however, very rare to see a computer on his desk.

ENTREPRISES & TELECOMMUNICATIONS: Is this as true for Japan as it is for the United States and Europe?

Matsuoka: Yes, generally, but things are changing. Young executives have a microcomputer in their homes.

ENTREPRISES & TELECOMMUNICATIONS: And how about you?

Matsuoka: I have a Navi, a workstation which operates on Kanji, the Chinese alphabet, and is therefore impossible for a European to use. The American version was named Navigator.

ENTREPRISES & TELECOMMUNICATIONS: The Navi has experienced start-up difficulties in Japan. But it is a machine that combines many useful functions. One suspects that its commercial career does not quite live up to expectations. Why is this?

Matsuoka: It combines five or six functions: telephone, fax, word processor, computer.... This kind of product always takes time to win over the general public. The second generation is more compact, less expensive, and is slowly gaining ground. It is a marvellous piece of equipment.

ENTREPRISES & TELECOMMUNICATIONS: It is an excellent product yet it has not made the breakthrough expected of it....

Matsuoka: It is more or less the same in the United States, the results were not as expected. I think it is a behavior problem, people are not ready for it. The Navi and the Navigator are products that are far ahead of their times. The executive is not ready to shed his fax, his microcomputer, his typewriter, his everyday environment and replace them with a single box.

ENTREPRISES & TELECOMMUNICATIONS: What level of investment in R&D do all these products involve?

Matsuoka: Canon invests about 10 percent of its sales figure in R&D and is currently setting up eight research centers throughout the world. We have 54,000 employees in the group, 10 percent of whom are involved in research.

ENTREPRISES & TELECOMMUNICATIONS: They say that you register quite a lot of patents? Can you give me a figure?

Matsuoka: We were number one in the United States in 1987 with 868 patents. There are no significant figures for Europe: The United States is really the reference point because all major companies register patents there. We were in third place in 1990 with 885 patents behind Mitsubishi in first place and Toshiba in second. Companies such as IBM or Rank Xerox are ninth and 33rd respectively (source: IFO).

ENTREPRISES & TELECOMMUNICATIONS: In Japan, you are number two in photocopiers, number two in word processing, and number three in faxes. Why are you not first in any of these fields?

Matsuoka: First of all, Canon is a generalist. Furthermore competition is much more fierce in Japan for office technology than in the United States. Each manufacturer has its own specialties. Ricoh specializes mostly in photocopiers. Canon, however, has tried to diversify into optics, photography, office technology.... Therefore, not being number one is normal. It is very difficult to be a generalist and to remain leader in one sector. However that may be, diversification is a very important strategy because if we had been strong in photocopiers only, there would be very little potential for future development.

ENTREPRISES & TELECOMMUNICATIONS: Canon Inc.'s major objectives for the next few years are to reach 100,000 employees worldwide, to multiply revenues fivefold, and to invest in new fields such as telecommunications and everything in relation to audiovisual technology. These objectives give the impression of a growth mania. Do you think they will be reached?

Matsuoka: We would like our sales figure in France to reach 8 billion french francs [Fr] in 1995, compared to Fr4 billion in 1990. This represents an annual growth rate of 15 percent, which is enormous considering that the market has reached maturity. Do we have what it takes to achieve this? I think so. I cannot say that we will be five times stronger in 10 years time, but it is our intention to try.

ENTREPRISES & TELECOMMUNICATIONS: A Tokyo newspaper, the NIKKEI SANGYO SHIMBUN, estimated a couple of weeks ago that "for those manufacturers who are at the very heart of the industry, technology is a vital element. However," it added, "if our manufacturers are reluctant to share their 'treasures,' they will never be able to rid themselves of the Japanese label. It is a choice that must be made," the newspaper concluded. Has Canon chosen to become less Japanese to be able to expand to a greater extent worldwide?

Matsuoka: Yes, very much so. When we refer to the Canon company, we mean the Canon Inc. company in Tokyo, but it is true that in France Canon is considered a Japanese company. It is true that there is a Japanese CEO and French investment, but most of the shares are now held by European shareholders, of Japanese origin of course. There is a marked tendency to try to become a truly French company. I do not think that this is making rapid progress, but we do not intend for Canon to

become a Japanese brand. Canon will still mean photography, photocopiers, yes, but its origin? Chinese, American? No, international. Canon is already present in France through its research centers, its factories, and its marketing companies. But is it really a French company? Of course, its major shareholder is Canon Inc., but President Yamaji announced at the inauguration that we would have about 100 engineers in three years, of whom only six or seven will be Japanese; the others will be European. And in the long term, there will be a French director at the head of the R&D center.

ENTREPRISES & TELECOMMUNICATIONS: Will Canon have to become an American-style multinational to become truly international?

Matsuoka: Not quite. In other respects, the weight of the American market is not the most important. In terms of consolidated revenues, Europe is in the lead with 33 percent, followed by the United States and Japan with 30 percent each, and 7 percent for other countries (Australia). Therefore Canon's most important market is Europe.

ENTREPRISES & TELECOMMUNICATIONS: Do you think that the European share as a percentage of your revenues is going to increase even more?

Matsuoka: Yes, the lifting of borders and the unification of the European market represent a most important phenomenon. It is excellent for European countries. It is also beneficial for us. And I hope that the Economic Community will not be a closed community, but one that is open to the world.

[Box, p 91]

Mister 1,000 Percent

If anyone knows about Canon France's excellent results (a growth in revenues of 1,000 percent between 1980 and 1990), it is Takenori Matsuoka who, at 52 years of age, has been CEO of the French subsidiary since last January. After spending five years in the Toride mother factory in Tokyo, Takenori Matsuoka arrived in France in 1983 as vice president responsible for administration. This manager, who speaks excellent French, is today at the head of Canon's most important outpost in Europe. Will he be known as "Mister 1,000 Percent" from now on?

[Box, p 92]

In France: 2,550 People and Four Subsidiaries

After 15 years activity in mainland France, Canon recorded Fr5.5 billion in revenues in 1990, i.e., an increase of 1,000 percent since 1980. As for the number of staff, it has risen to 2,550 people in four divisions: Canon France SA, founded in 1975, markets office technology and computer equipment; Canon Photo Video France SA, created in 1979; Canon Bretagne SA, established in Liffre in 1983, focuses on the manufacture

of fax machines; and Canon Information Systems R&D Europa SA, created in 1990, is a research center with a European orientation located in the Rennes-Atalante "technopolis."

On a world scale, Canon Inc. employs 54,000 people for a sales figure of Fr65 billion in 1990, i.e., a multiplication by four and a half in 10 years. Spending in research development (R&D) represented 11.3 percent of the consolidated revenues. The office equipment sector (photocopiers, faxes, laser printers) constitutes the greater percentage of the result, some 78.8 percent. Photography and video, on the one hand, and optics, on the other, complete the range.

French Electronics Trade Deficit Analyzed

91AN0465 Paris *ELECTRONIQUE INTERNATIONALE* HEBDO in French 6 Jun 91 p 2

[Article by Michel Heurteaux: "Trade Balance: Fr18 Billion Deficit for French Electronics"]

[Text] The slide is accelerating, almost inexorably. For the third year in a row, the electronics and computer sectors have registered a strongly negative balance of trade. The deficit will, according to provisional figures of the Federation of Electrical and Electronics Industries (FIEE), rise to 18.4 billion French francs (Fr) in 1990. This constitutes a further deterioration, since the deficit was Fr15.3 billion in 1989 and Fr13.2 billion in 1988.

Despite a slight advance in our exports (up 2.3 percent to Fr99.5 billion), our industries continue to suffer at the hands of foreign competition in the form of a further increase in imports; the latter rose last year to Fr117.9 billion, an increase of 4.6 percent. Thus, foreign competition has continued unabated and has even gained further momentum—especially that emanating from Japan and the "Four Tigers" [South Korea, Singapore, Taiwan, Hong Kong], as the FIEE statistics show.

Total sales of French industry with Japan come to barely 5 percent of our purchases, with the deficit reaching slightly over Fr20 billion in 1990. It is in consumer electronics that the deficit is degenerating most markedly, going from Fr6.3 billion to Fr7.4 billion on a year-to-year basis. In the computer sector, the deficit came to Fr6 billion; and in components to Fr2.4 billion.

A further negative factor, in addition to the overall loss of our products' competitiveness, was the depreciation of the dollar, which has substantially aggravated the drop-off in our sales to the United States and the growth of our purchases. Of a total deficit of Fr22 billion, for the overall electrical and electronics industries, the portion covering the computer sector comes to Fr14 billion; measuring devices, Fr3 billion; and components, Fr2.7 billion.

One consolation for the electronics sector was Europe, where French firms improved their position significantly. This trend, which had already made itself felt in

1989, was confirmed last year, according to the FIEE. Thus, sales to Germany, our top customer and our second supplier, grew much faster than purchases. The deficit for the whole of the electrical, electronics, and computer industries declined by some Fr700 million. More broadly, the trade balance with our EC partners improved slightly, featuring a trade surplus of Fr5.8 billion, versus Fr3.2 billion in 1989.

Siemens Plans Market Offensive in Automation Technology Against Asian Competitors

91WS0394A Landsberg *PRODUKTION* in German 2 May 91 p 1

[Article by wi: "Flank Protection for European Market"]

[Excerpt] Siemens Automation Technology continues its market offensive with two new products, a small stored program control and a robot control. The direction of the effort is unmistakable. "With this, we will make it more difficult for the competitor from southeast Asia to penetrate the European market," was the message from the chairman of the board of the division, Guenter Wilhelm, at the Hanover Industrial Fair.

With its Simatic equipment family Siemens Automation Technology is the dominating supplier worldwide in the stored program control field and has a 21-percent market share. But the competition is putting on pressure. Above all the Japanese are constantly expanding, primarily right outside Siemens' front door in western Europe, where 50 percent of all stored program controls are sold.

There is great danger that the east Asians will penetrate into the market segment for the smallest controls in the lowest performance field. The Nurembergers do not want and cannot allow that. In particular, according to Wilhelm, since the dynamics of demand in the business of automation components is gradually declining. And for small stored program controls it is ultimately a matter of a market volume of about 700 million German marks [DM]. Wilhelm, at least, regards the new small 90U stored program control, which is upwardly compatible with all other S5 equipment and which was completed in only 12 months and given its world premiere in Hanover, as an effective countermeasure against the Japanese offensive.

The European competition will greet this initiative in the small stored program control field, because Siemens thus secures the flanks in the lower performance area and makes it more difficult for the east Asians to reach the Old World. This was the case as early as 1986, when Siemens for the first time pushed aggressively ahead with the S5-100U in the field of small stored program controls.

This time Siemens is going a bit further, however. The product and sales strategy which goes into effect as of June 1991 could have been invented by a Japanese: The S5-90U can be used both in complex automation solutions and in controlling cooling and drink vending

machines, car wash installations, garage doors, cabinets or escalators and is sold like an ordinary mass product over the counter. At the astonishingly low price of DM500. Or even below that—if necessary.

Apparently, the plans go even one step further. There is much indication that with this aggressive pricing policy Siemens wants to attack the Japanese in their own country, the largest single market in the world. It will be exciting to see how the opponents react. The struggle has only just begun.

Siemens intends to take a similar approach with the new ACR 20 robot control, designed for complex tasks (at least six axes). The motto here is: More performance at a lower price. Wilhelm's expectations: "This current year want to sell up to 2,500 units annually of our first member of the new family." [passage omitted]

Germany: Top Laser Firms Cooperate to Block Japanese Competition

91WS0445A Landsberg PRODUKTION in German
29 May 91 p 1

[Article: "Two Laser Pioneers Take a Common Course"]

[Text] Frankfurt/Munich (gk) - The two experienced laser system producers—Messer Griesheim and Messerschmitt-Boelkow-Blohm (MBB)—have signed a basic agreement on cooperation. In the future, the two companies will collaborate closely in the field of laser technology and each will offer the other's products. Moreover, all further developments in laser-beam system technology as well as in uncovering new fields of application will be worked on jointly.

Dr. Lothar Bakowski, director of Messer Griesheim's laser department, gave a simple justification for the cooperative venture: "Why keep rediscovering the wheel?" If there is someone out there who already has the know-how, isn't it more sensible to cooperate. After all, the competition is not in Europe, but in Japan." This statement was particularly easy to make because the products offered by the two companies, which operate in different sectors of the laser market, complement each other almost perfectly. Thus, Messer Griesheim's laser facilities—the spectrum ranges from the positioning table to the small portal with emphasis on cutting—do business with numerous automobile producers and their suppliers. MBB, on the other hand, with its large portals, is considered the pioneer of laser-beam welding, especially of automobile bodies, a field that Messer Griesheim had excluded until now. The result is that MBB can now extend its product range downward, while Messer Griesheim can expand upward. The products of the two companies now cover the complete laser spectrum from the simple positioning table to the automated, ready-to-go production line for two- and three-dimensional structural parts.

But the partners are not just expanding their product line. Each can now profit from the other in the technological field as well. To date, Messer Griesheim was mostly active in the cutting sector, where the emphasis was on stand-alone machines for job-shops or pilot plants. The situation was different with MBB. The Munich company had made a name for itself in production as the pioneer in laser welding; MBB was also prominent as a main contractor for complete production lines. Its specialty was body-shells in the automobile industry, where MBB remains one of the few companies that has mastered the complicated clamping technique. The technological expansion resulting from this cooperation has brought the customer direct advantages as well. As Doctor of Engineering Wolfgang M. Baessler, director of products and projects in automation technology in MBB's power and industrial engineering department said: "Both Messer Griesheim and MBB can now offer both of these technological procedures with competence."

MBB has even more reasons for joining up with Messer Griesheim. Dr. Baessler: "We want our company to be active throughout Europe and this cooperative venture now makes it possible for us to use Messer Griesheim's distribution network."

Messer Griesheim, too, expects a business advantage. As Dr. Bakowski put it: "A large potential customer circle for our standard products is now opened to us through the companies belonging to MBB."

Italian Conference Evaluates EC Biotechnology Prospects

91MI0326 Milan ITALIA OGGI in Italian 26 Apr 91
p 9

[Text] The world biotechnology market could generate revenues of 41 billion European currency units (ECU) (more than 60 trillion lire) in the year 2000. This is the forecast that emerged during a conference held in Perugia on the state and future of a sector that is in continuing expansion.

The particular techniques used to produce almost all the chemical substances and pharmaceuticals that, up until just a few decades ago, were considered to be a kind of "new biology," have given rise to one of the most dynamic economic sectors. On the international level, the market is divided among a little more than 2,000 firms in the EEC, the United States, and Japan. "Within the Community," explained Dorio Mutti, vice president of the agro-food technological park in Umbria which organized the meeting, "the companies involved in biotechnological research number about 800 and employ 15 million people with more than two million job openings between now until 2000. The problem is that, in comparison with our Japanese and American competitors, our companies continue to be at a disadvantage because of the lack of protection they have for inventions and because of the fragmented nature of the market." On the other hand, firms in the United States can benefit from

an efficient information network and close ties between industry and universities, in addition to about ECU2.6 billion (about 390 billion lire) in government aid allocated for 1991 alone. As far as the availability of information is concerned, European firms are able to access only incomplete and limited data bases. The competitiveness of Japan, instead, is based entirely on the potential of its internal market, which should reach \$35 billion by the end of the century.

The results are clear: "Of the biotechnological patents deposited at the European Patent Office between 1986 and 1988," continued Mutti, "38.5 percent were American, 31 percent European, and 14.4 percent Japanese."

It is thus necessary to make up for lost time. According to a report by Federchimica Assobiotech (Italian Industrial Association for the Development of Biotechnology), almost 300 billion lire were invested in research and company funding in Italy, with an additional 300 billion supplied by private industry. The agro-food technological park of Umbria is one of the most successful initiatives of biotechnological research applied to industry. Its primary objective is to disseminate new techniques through agreements with European and non-European companies in order to achieve biotechnological manufacturing cycles in Italy in the shortest time possible. Even the CNR (National Research Council), launched 26 different studies in agriculture some time ago. In three years, ENEA (National Committee for the Research and Development of Nuclear and Alternative Energies) also invested more than 80 billion lire in research applied to both agriculture and health. As is normally the case, however, the primary obstacles are funding and the lack of effective coordination between research centers, private companies, and the regions involved.

As far as Europe is concerned, Manfredo Maciotti, a member of the EEC's general board XII for development and scientific affairs explained during the conference that, "between 1982 and 1989, the Community has developed research programs totaling ECU90 million. Another five projects for agriculture for an additional 200 million are also underway."

From the legislative point of view, on 17 April 1991 the EC Commission presented six directives to improve the competitiveness of biotechnology industries, which range from simplifying marketing procedures to R&D support, and from intellectual property rights to the availability of technical information. On 29 April, all the proposals will be submitted to the Ministers of Industry of the twelve member countries.

Sweden: Status of Ericsson's Telecommunications Activities

91WS0414C Maidenhead TELEFACTS in English
May 91 pp 11-15

[Text]

Ericsson

Ericsson's viability rests with its core business—public telecommunications. Unlike conglomerates such as Siemens or AT&T, Ericsson does not have the luxury of

supporting one business unit by siphoning capital from another. However, while AT&T, Northern Telecom, and Siemens aim to diversify beyond the domestic marketplace, Ericsson has built its business based on a strategy of internationalizing through liberal technology transfers, inexpensive financing, and clearing bottlenecks caused by political logistics. By proving it can succeed and hold its own in competition against larger conglomerates, Ericsson has also managed to stifle rumors of being an acquisition target.

In 1990, some 45 percent of Ericsson's sales revenues were derived from public telecommunications. The company sees Germany, Hungary, and Norway as particularly important markets. Another 25 percent of its sales came from radio communications. Cellular sales are reported partially through radio communications and the rest through public telecommunications. The company is considering the establishment of a separate group for cellular equipment. Rounding out Ericsson's global sales revenues, 14 percent came from cable and network systems, a division that Ericsson deems essential to its core business; 11 percent was derived from business communications; defense garnered 4 percent, and components generated 1 percent.

From a geographic vantage, European sales dominate the company's focus with 59 percent of sales. North American sales in 1990 just edged the company's Swedish revenues at 13 percent. Latin America accounted for 12 percent of sales; Asia brought 6 percent; Australia, New Zealand and Oceania accounted for 5 percent; the Middle East generated 3 percent, and Africa drew sales of 2 percent. Swedish sales figures, included in the 59 percent European statistic above, when viewed alone account for 12 percent of global revenues.

Following is an examination of some of Ericsson's key business activities and strategies:

World Public Switching

Position

- World Market Share, 1990: 12.6 percent of digital local lines already installed (DLLAI)

Largest Markets

- USA: Ericsson started installing major orders of AXE with Southwestern Bell and US West in 1990: 600,000 lines and 100,000 trunks were on order by the end of 1990.
- Mexico: Ericsson signed a \$180 million contract in 1990 with Telmex for AXE switches with a 1991 delivery date
- Hungary: Ericsson won a \$14 million contract in November 1990 for AXE and transmission equipment for rural networks.

- Norway: Ericsson signed a pact in July 1990 with Norwegian Telecommunications Administration for AXE switches for intelligent networks, ISDN, and GSM cellular covering the 1991-1994 period.
- Greece: Ericsson planned to supply 84,000 AXE lines by the end of 1990 through Intracom, Ericsson's local partner.
- UK: Ericsson signed frame agreement with British Telecom in October 1990 to provide AXE lines over a two-year period.
- Sweden: Ericsson received a \$62 million order from Televerket for rural AXE switches until the end of 1993.
- Czechoslovakia: Ericsson signed a pact in 1990 with Tesla Kolin for AXE local manufacture.
- India: Ericsson concluded an agreement in 1990 for four AXE international gateway switches.

Strengths

- A high level of global diversification gives Ericsson the option of moving resources from high-profit areas to markets that are less successful.
- R&D expenditure was increased by 13 percent in 1990 to \$860 million; a research center was opened in Aachen, Germany.
- Advances were made in the UK market.
- Politically, Ericsson has a "neutral" image as a Swedish corporation.
- The ELLEMTel joint venture with Swedish PTT provides government funding for R&D.
- Ericsson is the number one player worldwide in cellular equipment.
- The modular hardware and software of AXE allows for easy maintenance and upgrading.

Weaknesses

- Software limitations hinder Ericsson from competing in the USA for the 1A replacement market.
- Ericsson will have difficulty breaking into Germany since Siemens and Alcatel have effective locks on the market.

Strategy

- To use joint ventures, technology transfers and "soft financing" to maintain leadership in less developed countries.
- To concentrate on expanding presence in developed regions with emphasis on the USA and Europe; to locate more facilities within the European Community (EC).

Assessment

Ericsson's CO operations notched another growth year in 1990, far out-pacing the global growth rate for the industry as a whole. AXE line installations increased by

16 percent and trunk installations skyrocketed 127 percent, due in large measure to major shipments to Australia, Italy and the Netherlands.

Lars Ramqvist became Ericsson's president, succeeding Bjorn Svedberg in May 1990, and one of his first initiatives was to reorganize the company by decentralizing decision-making to international divisions. Ericsson is positioning itself as a geographically widespread company with administrative headquarters in Sweden. The firm, for instance, invested a minority stake in Schrack, the Austrian equipment supplier, and it purchased half of Orbitel, a British cellular company. Ericsson's decision to locate a major R&D facility in Germany could be as much a result of the company's desire to spread its centers throughout Europe as it was a reaction to Sweden's new 30 percent investment tax. With its new research center and its corporate ties to important German customers, Ericsson is a likely entrant into the German market.

Ericsson has shifted its focus somewhat back to the developed world because its planners believe the company cannot afford to finance third world development and because of increasing economic risks in the developing world. However, the company has no intention of retiring from developing world areas where it is strong—particularly Mexico, Brazil and China.

Ericsson's management feels it will be difficult this year to surpass 1990 performance. Accelerated R&D will jeopardize short-term earnings. Prices-per-line have been in the upswing as competing companies realize they must charge more to meet high expectations of demand. Europe, Ericsson's biggest customer, lagged going into the recession and will likely trail the USA coming out of the downturn. Ericsson management is not optimistic about performance in 1991 and 1992, but they are most hopeful about opportunities in Italy and France.

Looking to the next decade in telecommunications, Ericsson projects that wireless telecommunications may grow to serve 50 percent of its total subscriber base. Ericsson is especially optimistic about growth in wireless loop applications and PCN. Ericsson sees the no-wiring concept as particularly attractive for new customers, for hospitals, and for customers who require combined facilities like airports.

US Central Office Switch Market

Position

- Sales 1989: \$29 million
- Local Lines Placed in Service 1989: 18,000

Strategic Position

- Orders have been received from five of the seven RBOCs for AXEs, and Ericsson plans to ship 700,000 lines in 1991; all five switch orders are part of construction budgets, not trials.
- The growing list of US switch customers include Nynex, Southwestern Bell and US West.

- Ericsson hopes to gain entry to Ameritech and BellSouth through Intelligent Network and SS7 switching component sales.
- Ericsson is positioning itself to become the RHCs' "third" vendor; it has achieved its goal of attaining 10 percent of the US market.
- Ericsson sold off its cable and part of its transmission business to increase concentration on AXE development.

Strengths

- 1989 was a record year for Ericsson's worldwide operations with annual net income more than doubling to \$600 million.
- Ericsson is the number one cellular equipment supplier worldwide and a leader in worldwide SS7 installations.
- Ericsson has a strong worldwide CO reputation and is a key player in six of the world's top ten CO markets.

Weaknesses

- Ericsson has a relatively small installed switch base in the USA.
- The cost of maintaining a US presence is high.
- Ericsson does not have the liberty of supporting its CO operations by siphoning off capital from another division.

Marketing

- The software architecture of its AXE is touted as a means to allow for multiple applications, responsiveness to customer needs and long life cycles for installed products.
- The company stresses its long-term commitment to the US market.
- Ericsson is nearing its short-term objective of winning one-third of all new switch orders from three RHCs.
- The company has developed AXE-Compressed, a smaller, more economical version of the AXE, to capture rural and low-population markets.
- Regional offices are being established in Richardson, Texas, to serve Southwestern Bell, and in Denver, Colorado, to serve US West.

Manufacturing

- Ericsson has no US switch manufacturing currently, but may open US plant when and if large volume orders are received; it would require a sustained annual volume of 500,000 lines to make US manufacturing profitable.
- Ericsson's major AXE plant is located in Ingelsta, Sweden.
- Ericsson's software development is located in Richardson, Texas.
- The company's PCB manufacturing is highly automated, using Universal insert equipment, and integrated on a continuous manufacturing line right into circuit pack assembly operations.

- First-pass yield rates exceed 95 percent for high-volume runs.

Research and Development

- Ericsson spent \$592 on R&D in 1989.
- R&D generally constitutes 11-12 percent of sales.
- There is no applied R&D or basic research; only R&D that is directed towards a specific mission.

Service and Installation

- AXEs are shipped fully assembled.
- AXE CO switches do not use software generics per se, but rather packages of modules put together according to customer specifications; a typical end office requires 300-400 modules.
- A four-week customer training program is given on-premise at the Richardson, Texas, headquarters; charges are approximately \$160 per person for day lectures, \$205 per person per day for hands-on experience.
- Ericsson supports all products with 24-hour customer service hotlines.

Contracts

- Ameritech: orders for AXE service control points (SCPs) for 1990 installation in Ameritech Systems Integration Laboratory, Rolling Meadows, Illinois, and 1991 installation in two Chicago-area central offices.
- BellSouth: multi-year volume agreement for STPs to support BellSouth's conversion to SS7.
- Nynex: orders for two AXE switches, one to be placed in Queens, New York, the second in the Boston suburb of Watertown; AXE used to provide Interactive Mass Announcement Services for Nynetel; there is a general purchase agreement designating Ericsson the established vendor for future equipment bids.
- Southwestern Bell: five-year contract for replacement of 60-65 analog switches in Missouri; switches in small and medium-sized cities in Arkansas, Kansas, Missouri, Oklahoma and Texas.
- US West: orders for AXE CO switches for the carrier's 14-state network modernization program.

Assessment

Ericsson's commitment to the US switching market remains firm. The growth in AXE-based cellular switches and STPs, coupled with the firm's tremendous overall financial performance in the past two years puts Ericsson in a strong position.

Ericsson needs the same success in the USA that it has managed to achieve globally in order to hedge against its risky investments in the third world. Management feels that its high US profile has helped the company in certain European sectors such as universities. The US presence has also helped the company keep abreast of various technology trends in network operations support and data communications.

For Ericsson, US success will come at a high price. Having already met some of its short-range goals in terms of US market share, the outlook for Ericsson is favorable as long as it continues to focus on CO as its core business and exploits its growing relations with the RHCs in both CO and peripheral areas.

Global PBX, KTS, and Centrex Markets

Market Presence

- The biggest markets are Sweden, Italy, the UK, Mexico, and Spain: Ericsson is the number one supplier in Sweden, with some 18 percent of all PBX lines shipped.
- ISDN trials in Italy and Australia, which the company plans to leverage into additional system sales, have identified new global opportunities.
- Ericsson is the established player in the US PBX market, but its market share is eroding.
- Recent orders in the USSR for 19,000 lines indicate a battle to come with Alcatel for the emerging Eastern European market.

Products

- MD110 is offered in 20, 48, or 190 lines.
- PBXs are manufactured in the Netherlands, Finland, Mexico, and India through licensing agreements, and in China.

Market Strategy

- To provide leverage for CO equipment sales into CPE sales (e.g. Ericsson set up an Australian ISDN network using eight AXE switches and sells MD110s for business applications on that network).
- To concentrate resources on expanding European presence, particularly into Eastern European markets.
- To coordinate international marketing efforts, emphasizing Ericsson's strengths as a truly global player offering extremely cost-effective installations.
- To market the MD110 as a foundation for office automation facilities.
- To target very large system applications, emphasizing turnkey approach.
- To combat US market share erosion through improved direct sales and service efforts in the USA.
- To introduce upgrades twice a year.

Assessment

Ericsson is focusing its PBX efforts on its home base, Europe, while simultaneously consolidating MD110 software development worldwide in order to attract multinational business and defray costs. Attempts to become fully entrenched in overseas markets have previously put a strain on Ericsson's resources, but now the company is directing its energy to holding down the hordes of competitors who see Western Europe as their target market. It is simultaneously setting its sights on Eastern Europe, the USSR, and other markets with underdeveloped telecommunications infrastructures.

Recent statements from management indicate the company believes that the development of the eastern sector of Germany will be a far more difficult task than it first appeared.

Ericsson is also trying to rebuild its US market share. This, however, can only come at the expense of its share in Europe—a sacrifice that Ericsson is unlikely to make. Paring down operations to focus on the company's three main lines of business—PBX, CO, and cellular—has allowed Ericsson to recoup earlier losses and to improve its competitive position against market leaders Alcatel, Siemens, and Bosch.

US Cellular Market

Position

- Total Cellular Sales 1989: \$134,908,000

Product Line

- Ericsson sells a reconfigured AXE 10 switch in two sizes: CMS 8800 (maximum subscriber capacity of 10,000) and CMS 8800S.
- Ericsson also sells RBS 882 radio base station equipment.
- The CMS 8800/D has been introduced.

Strategic Position

- Ericsson is a major worldwide supplier of mobile cellular switching systems and telephones.
- The company is a leader in the technology and development of paging, CT3, and PCN cellular.
- Ericsson established a joint venture with General Electric called Ericsson GE Mobile Communications to manufacture and sell base station equipment and telephones in the USA.
- Ericsson devotes more than 11 percent of annual revenues to R&D.
- The company is focusing on TDMA technology development over CDMA.
- Beta testing is conducted on its digital cell site equipment.

Marketing and Sales

- To rely primarily on trade publications for advertising: \$100,000 in US media expenditures in 1989.
- To provide leverage for favored status with Cellular One and other non-wireline carriers to increase CMS 8800S sales.
- To offer large MSA carriers the ability to expand system capacity by 83 voice channels.
- Radio Systems Division employs 300 people involved in product planning, sales and marketing, customer support, and repair.

Service and Installation

- Twenty five percent of system sales include turnkey installations.
- Six teams of technicians located nationwide install new and expand existing systems.

- Ericsson offers 24-hour hardware and software telephone support.
- The company provides full customer training facilities for system hardware and software.
- Ericsson conducts quarterly user group meetings.

Pricing

- The CMS 8800 is priced at approximately \$800,000; The CMS 8800S is priced at \$350,000.
- Ericsson undercuts second tier suppliers on price to gain sales in rural markets.

Manufacturing

- All hardware is manufactured at AXE plant in Ingelsta, Sweden, and shipped to carrier site as needed.
- Applications software is developed in Canada, and operations software is developed in Richardson, Texas.
- Ericsson GE Mobile Communications established an R&D center in Research Triangle Park, North Carolina, in 1990.

Installations

- 833,000 US subscribers served at YE1989;
- 30 switches installed and 35,100 base station transceivers installed or on order at YE1989;
- 85 systems and more than 700 cell sites installed at YE1989;
- \$125 million received in orders in August 1990 from LA Cellular (one CMS 8800 and 35 cell sites), and McCaw (switch upgrades and cell sites in five markets);
- a \$250 million, five-year contract signed in October 1990 with Metro One in New York to replace Motorola switching equipment with CMS 8800 switches and base station equipment; Metro One will spend \$100 million in 1991 alone;
- a \$70 million contract signed with McCaw in October 1990 to replace AT&T switching equipment in Washington and Oregon with CMS 8800 switches and base station equipment;
- four switches installed with McCaw in California through mid-1990;
- sole switch supplier to LA Cellular;
- a \$13 million contract signed in 1990 with Cellular One in Milwaukee, Wisconsin, and Indianapolis, Indiana.

Assessment

After a late start, Ericsson is playing a fast and furious game of catch-up in the cellular switch business. A strategic alliance with General Electric is helping Ericsson to gain acceptance in the US market, propelling the Sweden-based company from a relatively minor player in the USA to a more commanding position. Combining forces with GE turned Ericsson into the second largest supplier of global mobile communications, behind rival Motorola. The joint venture with GE will also allow

Ericsson to focus on developing a digital handset to US standards before Motorola can do so.

Ericsson has responded to customer demands for a smaller CMS 8800 switch and is already attracting RSA carriers by under-cutting second tier suppliers on price. In 1990, Ericsson displayed impressive growth, signed significant contracts with several non-wireline carriers, and will continue to expand its market share. Ericsson will give both AT&T and Motorola a run for their money.

World Transmission

Ericsson is not currently a major transmission player, although it is said to have its eye on Rockwell's transmission division. If that purchase were to go through, the company could become one of the top five transmission suppliers worldwide.

Currently, Ericsson makes and sells transmission equipment merely to complement sales of the AXE switch, its primary business worldwide. Transmission accounts for only about 19 percent of Ericsson's telecommunications business—and this is declining as the company concentrates on switches. Ericsson sold its US telecommunications cable operations to Alcatel to focus on the switching business among the RBOCs, an area where it is making progress. Ericsson remains in the cable business mainly to serve the Swedish market and to maintain a beachhead in selected foreign markets, particularly Latin America.

(Northern Business Information Staff)

EAST-WEST RELATIONS

Belgian Companies To Set Up Industrial Site in Warsaw

91AN0464 Groot-Bijgaarden DE STANDAARD
in Dutch 17 Jun 91 p 1

[Article signed M.A.W.: "Belgian Industrial Site in Warsaw"]

[Text] Antwerp—A Belgian industrial zone will be established in Warsaw. For that purpose, 100 hectares have been made available by the administration of Praga Paludnia, a district of Warsaw. Apart from Belgian companies, the zone will consist of a business center, houses, and even a small hospital, DE STANDAARD was told by Leo Billion, the president of the business center at Zaventem.

A foundation for the development and promotion of the project has already been set up. According to Billion, Polish president Lech Walesa will be on the Board of Directors. (The matter will most likely be discussed during Walesa's official visit to our country on 2 and 3 July.)

On the Belgian side, various top people from the industrial, financial, and academic communities are said to be willing to take a seat on the foundation's board.

Financial support will be given by large Belgian banks and apparently various companies have already shown interest in setting up subsidiaries in the zone.

Leo Billion, who is also the president of Elbicon, a company with branches in Poland, owes the acquisition of the site to his good contacts with the local government. Since the ownership of the site is undisputed, companies need not fear any complications after the purchase.

Billion expects that once the infrastructure has been developed, the construction of the companies and the business center can soon be started. It may be finished in two to three years.

The [Belgian] Association of Christian Employers and Executives (VKW) is interested in organizing training programs for managers in the business center, general secretary Frank Lambert announced.

Thomson Consumer Electronics To Form Joint Venture in Poland

91WS0371A Paris LE MONDE in French 24 May 91 p 34

[Article by Francoise Lazare: "Thomson To Create Joint Venture Company With Polish Firm Polkolor"; first paragraph is LE MONDE introduction]

[Text] Over the next three years, Thomson Consumer Electronics (TCE) is going to invest \$35 million in Poland (some 200 million French francs [Fr]), more than the total invested there by all French companies combined in 1990. The agreement, providing for creation of a joint venture company by Thomson and the Polkolor company, was signed in Warsaw on 22 May by Bernard Isautier, president-general manager of TCE, and the minister of property conversion, Mr. Janusz Lewandowski. The signing coincided with the visit to Poland of a delegation of French industrialists headed by CNPF [National Council of French Employers] president Francois Perigot; the delegation is scheduled to depart on 24 May.

Warsaw—Mr. Janusz Lewandowski, Poland's minister for property conversion, said the accord with Thomson could mark "the beginning of greater Franco-Polish cooperation in the field of industry." Despite its strong traditional ties with Poland, France last year invested only \$15 million here, making it the country's seventh largest foreign investor.

Thomson spent 18 months reaching a unique partnership agreement with the makers of picture tubes for Polkolor televisions: It now owns a 51 percent stake in the new joint venture company created from Polkolor, an arrangement which allows Thomson to avoid being

saddled with the company's ancillary activities or total liabilities. Polkolor's bank creditors are invited to become shareholders in the joint venture company. Thomson hopes with its nearly Fr200 million investment to boost Polkolor's production capacity from 1.5 million up to 2 million tubes and to export to both East and West Europe.

Employment Cutback

In Warsaw, the accord is being trumpeted as a rescue of the Polish company, which according to the press release might have faced liquidation "without a major financial injection and prospects for manufacturing modern tubes." Thomson makes no secret of the fact that some of Polkolor's 4,000 employees will have to go—there are plans to cut about 800 employees from the payroll—but it has pledged to soften the blow by providing employees laid off with compensation equal to one year's wages.

If cooperation between Thomson and Polkolor bears fruit, at the end of what Thomson CEO Bernard Isautier calls "the difficulties we must surmount over the next two years," a major Polish industrial firm will have been saved from bankruptcy. Thomson might then be in a position to realize its objective of becoming one of the world's top manufacturers of television picture tubes.

Siemens's Past, Future in Hungary Discussed

91WS0400A Budapest MAGYAR ELEKTRONIKA in Hungarian No 2, 1991, pp 3-5

[Interview with Laszlo Haklar and Arpad Gosztak, by B. L.: "A Hundred Years Past—A Hundred Years Future"; first paragraph is MAGYAR ELEKTRONIKA introduction]

[Text] There are few firms in Hungary which have such great traditions as Siemens. It is true that the activity of the German firm had a break with the nationalization, but now it has renewed the offensive in order to win back its traditional positions. The world, of course, has changed a lot, and the policy of Siemens is different than it was before the Second World War. But even now the approach is fundamentally that the presence of Siemens should be good for the firm and good for the Hungarian economy. New proof of this is the Siemens enterprise being born, a cooperative venture of Siemens and the Telephone Factory. Laszlo Haklar, director general of Siemens Hungary Ltd., talked to our journal about the hundred years past and Arpad Gosztak, managing director of Dunatel Ltd., talked about the future.

MAGYAR ELEKTRONIKA: What events, from the hundred year history of Siemens, would Mr. Haklar mention, events which had great significance from the viewpoint of the development of the Hungarian electric and electronics industry?

LASZLO HAKLAR: On the one hand this hundred year career was difficult, on the other hand it was successful for Siemens, even if there were very serious breaks in it.

The connection began even at the time of the Monarchy with the construction of the first (20 kilometer) electric railway. Not many recognize an interesting feature of this. The town fathers did not authorize the building of overhead lines because they would make the city ugly. They paid a lot for that! The other notable matter was the millenium underground railway, with which Hungary was the first in Europe. It is not often that we can brag of such a thing in our history. As is well known Siemens had the lion's share in the building of this.

Siemens was a significant player in the Hungarian economy between the two world wars. The firm with about 2,000 employees represented a significant industrial potential—at that time. Siemens had interests in Hungary in cable manufacture, communications engineering, medical electronics, and the manufacture of electrical apparatus.

MAGYAR ELEKTRONIKA: Mr. Haklar, do not be angry, for my saying this, but I would like us to make things a little more concrete. My generation does not even know where the Siemens interests were in Hungary. I know that there was a Siemens enterprise in cable manufacture.

LASZLO HAKLAR: There were two cable factories in Hungary before the Second World War, Siemens Cable and Felten. These were about the same in size. After the war they were joined together to create the Hungarian Cable Works. Now, as a joint venture of Siemens and the Cable Works, Dunakabel will soon begin production.

Evig was also a Siemens enterprise; they manufactured electric motors and apparatus. Few know that Schuckert on Nagymezo Street was also a Siemens interest, at least in part; it was a firm manufacturing X-ray equipment. But in addition to these there were firms—companies with completely independent rights—in which Siemens had interests. It would take some serious historical work to be able to describe with sufficient detail and seriousness the hundred year history of Siemens in Hungary. This is not the time for that, rather we should be thinking about the future!

MAGYAR ELEKTRONIKA: I know that—at that time—it meant a high rank among workers and employees to work at Siemens, just like, let us say, working at United Incandescent. Our generation, unfortunately, no longer knows the feeling, to be proud of where one works, of the sign above the plant. What gave Siemens a basis for this pride?

LASZLO HAKLAR: Unfortunately the generation which belonged to the Siemens family at that time is slowly dying out. One reason for the pride was that it was not easy to get in. For example, employees applying for a position were tested and were taken on only for a probationary period. When they proved themselves on the job then they were finalized and integrated into the Siemens family. This is an interesting thing!

Siemens does not come into a country for a little flirt, like now investing several million into something to see what will happen. It could do so easily, but it does not. It has a strategic goal in a country, or it does not come in. If Siemens wants to be active in some area it takes it very seriously. The thinking in connection with the Telephone Factory shows this well. It is not unusual for Siemens to take time to get manufacturing going, it will not be profitable from the first moment. Siemens thinks in the long term, after laying a good foundation one must have economical production for the long term. Siemens is not an impatient investor of capital, it is a sufficiently stable enterprise to see the longer perspectives. At the same time it is natural that deficit production is not permissible; the investment must pay off within a realistic time, and must produce a profit for the firm. Only thus can it be assured that they can finance the development adequately. And this proves that we can think in strategic stages.

MAGYAR ELEKTRONIKA: What role will Siemens Hungary Ltd. have in this?

LASZLO HAKLAR: Siemens Hungary is a "roof" over the activities of Siemens in Hungary. Our job is to conduct a business and industrial policy, on the basis of the central decisions of Siemens, which—keeping in view the interests of Siemens and taking into consideration the demands of the Hungarian market—will make possible a rational and continual building up of activity in Hungary. When Siemens recognized that there was again a possibility here for broad market and manufacturing activity it consulted with the official Hungarian political leadership as to what the goals and guiding principles should be. The leaders said that it would be good if we were to think of establishing contact with the existing Hungarian industrial enterprises to acquire manufacturing capacities which fit the Siemens profile and thus give impetus to production. We should introduce modern products which can be sold on the world market and not try to build a new factory ourselves. (This latter would be much simpler.)

Siemens accepted the governmental concept. There are industrial enterprises here with great traditions which went to ruin in the past 40 years but which still represent a traditional industrial culture. They include, for example, the Telephone Factory and the Hungarian Cable Works. The Telephone Factory, for example, is one of the oldest telecommunications enterprises in Europe. Before the war its name rang throughout the world, and the staff today also represents outstanding intellectual capacity. Hungarian economic policy and the interests of Siemens meet at this point.

Siemens Ltd. takes care of the coordinating task, but the manufacturing activity will be realized in the mixed enterprises. Siemens wants a majority in these so that it will have sufficient freedom of movement, so it can make independent decisions in development-investment policy. This is very important because cycle times are

very short today in product development and manufacture and a state of affairs cannot be conserved for a longer time. This would be bad not only for Hungary but also for Siemens, because it would have its capital tied up without being used. For example, it certainly will not be possible to manufacture transmission technology and switching technology equipment 10 years from now with the technology of today. Both product and manufacturing technology must be developed constantly. We do not want to sell just once, we want to be in Hungary for the next 100 years too.

MAGYAR ELEKTRONIKA: Mr. Gosztak, the result of the telephone system tender has been announced. Siemens is one of the two winners, which is no small achievement in this competition. I think that in the bid it was the industrial policy part in which Siemens was—probably—the strongest among those competing. Could we learn something about this now in more detail?

ARPAD GOSZTAK: The industrial concept was really a very important part of our bid. Let us look at a few points from this. Siemens and the State Property Agency are establishing the Dunatel mixed enterprise, which includes the Budapest factory unit of the Telephone Factory. This mixed enterprise is being founded not by the Telephone Factory and Siemens but rather by the Hungarian Republic and Siemens. The contribution of the Hungarian Republic in this is the Budapest factory unit of the Telephone Factory; Siemens' share is 50 million marks in ready money, which is on deposit in Budapest banks already. So the Telephone Factory is being abolished only in a legal sense, it is not abolished in its physical reality. Siemens does not want to sweep out anything which is good and functioning.

MAGYAR ELEKTRONIKA: Let's take a look at what activity spheres the mixed enterprise will be working in!

ARPAD GOSZTAK: The first and most important is beginning manufacture of the EWSD exchanges. We are counting on a turnover here of nearly 6 billion forints by 1995, with 610 employees.

Packet switched networks belong in the number two activity sphere. This will represent a volume of 50 million forints, with only 10 employees.

The third activity sphere is digital and analog transmission technology. The already existing analog transmission technology system of the Telephone Factory, with a turnover of 100 million, is part of this. The digital technology of the Telephone Factory is showing a decreasing tendency and will be replaced by Siemens digital technology, which will be up by 1995. The whole thing will represent a turnover of 2.5 billion forints, with 295 employees. So the activity sphere of the Telephone Factory up to now remains here in its entirety.

The fourth area is telephone sets. There will be 170 people working here in 1995 with annual receipts of 1.5 billion forints according to the plans.

The fifth is manufacture of printed circuit boards. The Telephone Factory has a printed circuit manufacturing line of European quality which is unexploited at present. The plans show this as a separate profit center; it will produce receipts of 420 million forints with 65 people. In 1991 already we are scheduling a production value of 390 million. The market for this is Siemens itself, we will ship printed circuits to several Siemens enterprises, including Siemens Austria.

Subexchange technology belongs in the sixth activity sphere. Here 22 employees will produce receipts of 130 million forints in 1995. We are not talking about manufacture here but rather about assembly.

The seventh is software development, and again Siemens will be the customer market. This is going on already. It will represent receipts of 32 million forints in 1991 and 100 million forints by 1995.

Insofar as the plans are completed the seven activity spheres involve planned receipts of 10.6 billion forints by 1995, employing 1,600 people. The activity spheres include trends which are going up, such as EWSD manufacture, and trends which are going down, such as traditional transmission technology. Looking at it from the employment side this means that we will need 1,100 fulltime employees in 1991; this will increase to 1,600 by 1995, in which time the production value (calculated at Siemens prices!) will double.

MAGYAR ELEKTRONIKA: Could we also know something about the planned investments?

ARPAD GOSZTAK: In regard to investment we planned 690 million forints for 1991, of which 432 is foreign exchange. Investment in 1992 will be 480 million, of which 346 million is foreign exchange; in 1993 the figures are 220 and 170, in 1994 they are 212 and 170, and in 1995 they are 212 and 170 million forints.

In the first phase of investment the goal is development of base technology; this will cost 400 million forints, and all of it in foreign exchange. This is needed for the EWSD manufacture, which represents nonexistent technologies. Infrastructural investment—all in forints—comes to 60 million; this is building construction. I would like to emphasize that this year the mixed enterprise will devote 40 million forints (with an 8 million foreign exchange part) to training. This had to be done, to teach new trades. And another 90 million forints will go for retraining connected with the transformation; this is a total of 130 million forints. Everybody must study here like a little angel! This will decrease gradually later but it will never be zero; even in 1995 the plans call for 12 million forints.

Concerning the training levels it must be said that those studying include the supreme leadership, the main department chiefs, the group leaders, the division leaders and every employee who participates in production.

MAGYAR ELEKTRONIKA: I regard this as an especially valuable part of the program, because it obviously means that what we must develop here is an enterprise working in a completely Western style. What is valuable is not simply the mastering of a style but also the development of a production culture at this level. But, if you will permit me, let us go further. What does this investment mean physically?

ARPAD GOSZTAK: Let us start from the fact that in 1995 manufacturing will be done on 25,100 square meters. The present area of the Telephone Factory is substantially greater than this.

On the basis of the first architectural approach we will demolish the second half of the buildings above Hungaria Boulevard (counting from the corner with Thokoly Street) and several smaller buildings in the courtyard. These include buildings from the last century which cannot be redone to meet current technological requirements. The good buildings will only have internal reconstruction; the outsides of the buildings must be changed also. There is no need for new construction.

MAGYAR ELEKTRONIKA: I have two more concrete questions. One is what the Telephone Factory is doing in 1991, since the investment is just now getting started.

ARPAD GOSZTAK: The Siemens contract makes it possible to deliver telephone exchanges this year which are not made in Hungary. So 1991 is the year of great preparation because according to the bid we will be shipping for forints in 1992, 100 percent.

Everything must be done so that in the meantime the Telephone Factory will fill its orders in accordance with contracts signed last year. So the investments must be realized in such a way as not to stop existing production for even one day. This is not only possible, it must (!) be done. We must simply forget the adage "That will be good tomorrow too."

MAGYAR ELEKTRONIKA: My second question is, How is the collective of Telephone Factory workers accepting this transformation? I think there must be those in whom these requirements awaken doubts, who do not want to meet them.

ARPAD GOSZTAK: In general people are receiving the expected events with pleasure, trust and some uncertainty. It must be remembered here that the Telephone Factory had its own modernization program which the enterprise trade unions approved. Because of the market changes the enterprise leadership decided that only the Budapest site would be the Telephone Factory. (This was an idea entirely independent of Siemens.) The provincial units voted for this too. So in the middle of last year we had already stopped production in Kiskoros. We sold the sites in Satoraljaujhely and Bugyi and the Nagykata factory unit will be independent. So in this sense the Siemens concept and the Telephone Factory's own concept about the number of employees do not differ—

essentially. For the workers the entry of Siemens represents an internal structural transformation and—naturally—it means much higher requirements in training and in work morale. So it gives a feeling of security that their jobs are secure; but their benches are not secure, and this yields uncertainty.

What is good in the Siemens concept is that it does not want to tear down anything which exists; it does not want to send people out onto the street.

EUROPE-ASIA RELATIONS

Japan's NEC Plans European Penetration Strategy

91AN0423 Zellik *INDUSTRIE in Dutch Jun 91 p 28*

[Article: "NEC [Nippon Electric Company] Attacking Europe"]

[Text] Sumitomo offshoot NEC is the fourth largest computer manufacturer (after DEC) and the fifth largest supplier of telecommunications equipment. In 1990, it produced a \$21-billion turnover. It now intends to concentrate more on export and is looking for a position in the European market.

Some 20 years ago, the then director, Koji Kobayashi, formulated NEC's long-term strategy: the convergence between information science and telecommunications. This appears to have been the right choice.

NEC has also achieved success in the field of microcomputers. It has overtaken its Japanese rivals Epson and Toshiba and is currently number six in the field.

Now NEC's main aim is to consolidate this success through increased exports. Up till now only 26 percent of turnover has come from exports, primarily in the United States. It is now attempting to increase this figure via the European market.

NEC has been cooperating with Bull. It owns 15 percent of Bull HN, which is based both in the United States and in Europe. NEC would like to give its projected European production a legal footing by taking a part in the holding *Compagnie des Machines Bull*.

NEC's European offensive is most visible in France and Germany. NEC has very ambitious plans for the production of mobile telephones in Northern France, and its French branch, which sells peripheral equipment and parts, is currently busy taking on executive staff. In Germany NEC's recruitment drive is over and next year should see the start of production of portable microcomputers, NEC's outstandingly successful product.

Japan Makes Inroads in EC Robot Market

91AN0454 Amsterdam COMPUTABLE in Dutch
31 May 91 p 9

[Article by Richard Mieczkowski: "Japan Takes Lead of Robot Market—Over 1,000 Robots Installed in the Netherlands"]

[Text] Utrecht—Through 1989, two-thirds of the robots purchased in the Netherlands were European products. After 1989, this market share plummeted to 33.6 percent. Japanese suppliers have taken charge. Of all robots sold in the Netherlands, 45.6 percent are now Japanese. Through 1989, the Japanese share was 10.4 percent.

During the "Matic '91" factory automation fair held in Utrecht, Eng. I. Vermeulen, director of the Bilthoven-based Anertek market research and training bureau, reported that in September 1990 the 1,000th robot was installed in the Netherlands. Since 1986, the Dutch robot population has been one of the subjects researched by Anertek. During those years, annual robot sales varied from 140 robots in 1986, to 120 in 1987, 138 in 1988, and 168 in 1989. In 1990, 160 robots were installed. At this moment, 1,091 robots are in operation, according to Vermeulen's estimates. This count includes the SCARA, a somewhat simpler, four-axis robot.

Japan's advance is especially striking in the robot market. The biggest user of robots is Volvo Car. According to Vermeulen, this originally Dutch car factory in Born has been degraded to "just an assembly plant for its Japanese (Mitsubishi) and Swedish (Volvo) owners." Vermeulen said he feared for the European robot industry, "because if Mitsubishi buys a robot, it will not be an ASEA." He thinks that the majority of autonomously operating robots will be of Japanese origin anyway. The more complex robots, which are part of a larger system, will remain European (German or Italian) for the time being. Not because the Japanese cannot produce these, but the numbers sold are so small that they are not commercially rewarding. From the consumer's point of view, good communication with the supplier is important and communication with Japan is difficult, according to Vermeulen.

A repercussion of Japan's supremacy favorable to the consumer is that prices are going down. "Robot prices have gone down to Japanese levels," says Vermeulen. Whereas 150,000 guilders for a new six-axis robot was normal five years ago, these now cost an average of 80,000 guilders. The struggle for market shares is being fought in the middle bracket, because 240,000 guilders or more is readily being paid for a top model.

Of the 33.6 percent robots of European origin, ASEA is the largest manufacturer with 20.4 percent (down from 47.2 percent before 1989). Kuka is a stable runner-up with a steady 6.6 percent share, but is vulnerable due to its complete specialization in robots for the automobile sector. IGM was able to increase its market share from

3.7 to 4.5 percent. Cloos went down from 5.9 to 2.1 percent and Reis (previously 1.3 percent) no longer appears in Anertek's charts.

Although the share of U.S. robots has decreased only slightly from 11.1 to 10.5 percent, this group was wiped from the market with the exception of Adept. IBM's market share decreased from 6.6 to 1.5 percent. Unimation (previously 3.3 percent) has also disappeared from the charts. Adept's market share increased from 1.2 to 9 percent, but Vermeulen questions the U.S. nationality of this manufacturer.

In the Japanese quarter, the market shares of all brands have increased. Panasonic even managed to become the absolute market leader from out of nowhere in three years (22.8 percent). Hitachi rose from 4.6 to 8.7 percent, GMFanuc went up from 1.7 to 7.8 percent, and OTC from 2.5 to 6.3 percent.

Hitachi's success also caused Valk Welding to become the largest Dutch robot supplier with a 28.5-percent share of the market (up from 12.6 percent). ASEA Brown Boveri's (ABB) share as supplier (the ASEA brand is also supplied via other companies) went down from 33.6 to 15 percent. Other climbers are EMB (from 1.2 to 9 percent, especially through Adept's SCARA robots), Geveke Electronics (from 4.4 to 8.7 percent), Landre (from 1.7 to 7.5 percent), and Morelisse (from 0.9 to 6.3 percent). Philips' market share decreased from 1.7 to 0.9 percent, but these are mainly in-house supplies.

An interesting development is the use of robots in the food industry, where they are mainly used for packing small batches (diabetes products, small export series) in varying packages. Eng. J. Bouwman of EMB Techniek praises the rapid convertibility of robots. As an example, he mentions the filling of tubs of margarine. Sometimes the maximum filling line has to be modified four or five times a day for different tubs, which is a "terrible burden." Using robots makes this faster. Moreover, hygiene is improved and quality enhanced. Another reason for using robots in the food sector is their reusability when the packaging has undergone a drastic change. "Normally, millions of guilders are wasted in converting a packing line to a new packaging," Bouwman observes.

Fujitsu's EC Computer Market Penetration Strategy Outlined

91AN0418 Paris ZERO UN INFORMATIQUE
in French 10 May 91 p 26

[Article by Richard Evans: "Fujitsu's Gentle Attack"]

[Text] Since the announcement of its 80-percent stake in ICL in July 1990, the Japanese giant has been moving quietly toward consolidating its position as the major information technology supplier in Europe. Its aim: To become number two after IBM.

"It is evident that Fujitsu, more than any other Japanese firm, is to play a major role in the future single European market," explains Peter Grindley, an economist specializing in business strategies at the London Business School. "Fujitsu is not at all afraid of competition." For the 1990-1991 fiscal year, Fujitsu is anticipating a worldwide return of \$574 million, an increase of over 20 percent compared to the previous year.

Although its aim, not always clearly stated, is to conquer Europe, Fujitsu is anxious to profess itself a European company: 95 percent of the company's 2,500 employees in Europe are Europeans and the greater part of its R&D and manufacturing activities is carried out locally. Fujitsu Europe sponsors an English football club and the British Museum and will participate in the funding of the Seville World Fair in 1992.

It must be said that Fujitsu has carefully planned its attack on Europe. The acquisition of ICL and the agreement with Siemens to produce large-scale systems in Europe has enabled it to appropriate a highly vertically integrated structure and has given it access to European markets. Fujitsu Europe is now active in all West European countries and is positioning itself as a supplier for a vast range of products.

This is how, over the past year, Fujitsu has started installing a 500-km fiber-optic network between Germany and the United Kingdom. When completed next July, this link, with a capacity of 18 Gbit/s, will be the largest fiber-optic network in the world. Fujitsu has also been commissioned by British, German, Swedish, Norwegian, and Finnish state telecommunications companies (PTTs) to install this system. It won these contracts over major European telecommunications firms. Another victory on German soil is the delivery of 30,000 G-3 photocopiers, which makes the Japanese firm number one in this market in Germany.

Creation of a Chain of Nine Semiconductor R&D Centers

In France, the French subsidiary, which opened at the beginning of March, is launching a fierce attack on the printer and portable telephone market and is providing French original equipment manufacturers (OEMs) with spare parts and peripherals. In Spain, Fujitsu is number one supplier of ATMs (Automatic Banknote Dispensers) and in telecommunications.

In regard to production plants, the Fujitsu-Europe group now comprises an assembly and a components plant in Ireland, a multiproduct and peripherals plant in Spain, two service and maintenance centers in Great Britain, and a chain of nine semiconductor R&D centers throughout Europe. A \$400-million factory for producing silicon wafers is currently being built at Newton Aycliffe, in the north of England. Upon completion of the European single market, Fujitsu-Europe will be capable of competing with European companies on an

equal footing without having to consider the trade restrictions which will hit less well established multinationals.

But Fujitsu's main target in Europe clearly remains IBM, from which it wants to take a share of the market, not only in the area of large-scale systems but also in the new range of workstations due to be announced during the second half of the year. The aim: To become the number two in information technologies in Europe behind IBM. This has not stopped the two "enemy" companies from signing a cooperation agreement for the development of an open system.

Nissan Establishes R&D Center in Belgium

91AN0456 Rijswijk POLYTECHNISCH WEEKBLAD
in Dutch 23 May 91 p 11

[Text] Nissan is going to strengthen its R&D in Europe by establishing the Nissan European Technology Center (NETC) in Leuven, Belgium. The current research center is located in Brussels. The new center will have an area of 42,000 square meters. Moving to the new center and equipping it will cost about 3 billion yen or over 40 million guilders.

Nissan's areas of concern in Belgium are technology, styling, legislation, and testing of exhaust emissions for the European market. The new research center, which will go into operation in 1994, is to play a major role in the adaptation of passenger cars to the EC market. Eighty persons will be employed in Leuven. In addition, Nissan has set up research facilities in the UK and in Barcelona (Spain). The car manufacturer is about to expand in the Netherlands as well. The floor space of the Nissan Motor Parts Center in Amsterdam will be enlarged from 21,850 to 91,050 square meters. The expansion, which should be completed by the end of this year, will cost 20 million guilders and is intended to anticipate the European markets and the growing demand for parts.

In Japan, Nissan is building a components factory in Oita. The plant should be ready by 1995.

Japan's Omron Expands Dutch Electronics Production Plant

91AN0424 Zellik INDUSTRIE in Dutch Jun 91
pp 38-39, 41

[Article by Wim Heirbaut: "Omron Concentrates Its Know-How in Den Bosch"]

[Excerpts] The Japanese firm Omron officially opened its European production center last month in Den Bosch, the Netherlands. By the end of this year, its European R&D center will also be in operation.

The Japanese electronics manufacturer Omron is going worldwide. In 1986 and 1987, the Japanese multinational's trading results were hit by the sudden decrease in the exchange value of the Japanese yen. In order to be

better prepared for such catastrophes in the future, management developed a long-term plan. This plan, known as "Golden Nineties," is divided into five parts, each lasting 3 years. The final aim is to triple Omron's present turnover by the year 2001. In 1990, Omron had a sales figure of \$2.634 billion and by 2001 it would like to reach \$10 billion. This sales increase will have to come from a new management structure, a restructuring of its activities, and a new corporate culture.

As part of the long-term plan, the concern underwent a name change last year. It is no longer called Omron Tateisi Electronics but Omron Corporation. The Tateisi family is still firmly in control in the new headquarters in Kyoto, but at the same time more decisionmaking power has been given to the regional headquarters. Says Yoshio Tateisi, president and acting director: "Since 1988, Omron has been split into regions, whereas previously it had been divided into product groups. Worldwide, we have four growth zones: Japan, Asia-Pacific, Europe, and the United States. These four zones will work independently of the main headquarters as far as production, finance, and applied R&D are concerned. Each growth zone will have its own management."

Omron Needs PLC Software

Omron is active in five markets: control components and systems (61.7 percent of revenues); systems for electronic transfer of funds (15.7 percent); office automation systems (8.8 percent); medical and nursing equipment (6.2 percent); and social systems (3.1 percent). New in 1990 was the founding of Omron Communicative Creation Co., which is involved with advertising and sales supporting promotion.

On the subject of production policy, Yoshio Tateisi says: "We intend to expand our microelectronics activities. We want to be the number one in components and to strengthen our position in the automation systems market. Our greatest competitor in the field of industrial automation in Europe is Siemens."

As far as industrial automation is concerned, Omron's programmable logic controller (PLC) trade is currently a source of concern. Sales are still rising in Japan, but elsewhere in the world, 1990 sales figures have seen a severe downturn. According to Yoshio Tateisi, this is because Omron has focused too much on the sale of hardware, instead of offering systems. "We have to increase our software R&D capacity so that we can sell solutions to our clients. In addition, we must consider the best possible ways to conclude strategic alliances with other businesses in order to obtain the technologies which we do not have at present."

Omron has two production plants in Europe. One is in Telford, UK, where control panels for photocopy machines are made. Omron intends to extend its European capacity on the mainland of Europe in the Dutch town of Den Bosch. It has purchased a 50,000 m² building lot in the Maaspoort industrial area and has an option on another 23,000 m². The factory itself covers

4,000 m² at the moment. Since May 1990, it has been manufacturing some 300 types of PLCs and some 70 types of temperature controllers. This year a line for the production of industrial sensors will be added. "In 1991 our output will be worth about 20 million guilders. In the next 4 to 5 years that amount must double each year," according to Tsutomu Narita, the "big boss" in Europe. He is chief executive officer of Omron Electronics Europe BV (Hoofddorp, the Netherlands), president of Omron Manufacturing of the Netherlands BV (Den Bosch, the Netherlands), and managing director of Omron Electronics AG (Cham, Switzerland). One of his first assignments is to put a European management team together.

Den Bosch is also to become Omron's European R&D center. By the end of this year, a research team will start working on fuzzy technology (see box). These people will cooperate with the universities of Aachen, Eindhoven, and Maastricht. In 1992, a research team will begin work on industrial automation. Their main task will be the development of PLC software. This will be done in close cooperation with several Dutch technical colleges and with selected distributors. In Belgium these will include such companies as Cheyns, Lampencentrale, and EIA.

Dutchman Willem Noordhof is presently the day-to-day manager of the factory in Den Bosch. He reports to general manager Zennosuke Fujiwara and may be his eventual successor. In the absence of a purchasing manager Noordhof is also doing that job for the time being.

Local Purchasing Still a Problem

At the moment, mostly packing material is supplied locally. Most of the electronic components and the boards still come from Japan. When the production of photoelectric sensors begins at the end of this year, the plastic packages will be bought in Europe.

As a matter of fact Omron has difficulties in finding "good" European suppliers. Says Tsutomu Narita: "Our aim is to buy 100 percent locally. But the quality and prices of the (European) microelectronics industry do not meet our requirements. European standards are also a problem. We are studying how we can use European products by conforming them to our designs."

Nonetheless, Narita says that 35 percent of Omron's supplies are already purchased locally in Den Bosch. "Some components cost twice or three times as much as in Japan." He is pinning his hopes on Japanese suppliers coming to set up in Europe.

At the moment, 85 people work in the factory in Den Bosch. Most of the workers are unskilled. Despite this Omron is attaining a very high quality standard, with an average rejection rate of less than 1 percent. This is partly due to the high level of automation; there is, for instance, an integrated line for placing and soldering surface-mounted components onto printed circuit boards. The pick and place machines were supplied by Fuji and adapted by the Dutch Bercom company. This

line has been especially built for the production of small batches of 1 to 20 pieces. The repositioning is carried out automatically by reading the information of a magnetic badge into an Alfabet terminal.

Factory Adjusted to Small-Batch Production

According to Willem Noordhof, "the line is set up so that batches of 1 to 20 pieces can be automatically manufactured. Usually our products—including the PLCs—are unique. We never make more than 20 pieces. If ever we need more, we make a second production run."

In principle, the Den Bosch plant works to order. The orders usually come from national sales companies, which also hold a certain amount of stock. In addition, Den Bosch also makes customized products for certain external customers.

Noordhof continues: "In the beginning, we will primarily be making standard products but later we will broaden our range. We must be prepared to work with the client in mind, in small amounts and with an eye to efficiency. That will not be very different from our present manner of working. We are already making standard products as though we were producing small customized batches. Because we see the future being in this sort of production line, we have already begun working with it."

As far as floor space is concerned, the factory is now operating at 50 percent of its full capacity. The present machine park is able to cope with variations in demand of up to 20 percent. Noordhof: "We are now very close to our maximum capacity. As far as the machines are concerned we have a fairly large overcapacity. The people who do the assembly work are the critical factor. Future short-term growth will be achieved by increasing the working speed of workers. Along with routine, productivity will rise."

After speed comes quality in the Den Bosch factory. Each operator performs quality controls and defects can be repaired at each workpost. Graphics showing the daily progression in quality are posted in easily visible places.

In fact the work day begins with a short discussion of the quality and quantities which were produced the day before.

The printed circuit boards which come off the surface mounting line are automatically checked by Omron's VT-4000 vision system. This machine is unique in Europe. In Japan there is already a complete product line of such machines on the market. Introduction into the European market is projected.

The VT-4000 projects three colors of light onto the surface-mounted boards: red, green, and blue. A camera records this picture, a computer digitizes it, and compares it with the master picture in its own memory. In this way, it is possible to check each component for presence, position, correct polarity, and correct soldering links, speedily and automatically.

[Box, p 41]

Fuzzy Logic Systems Also in Europe

Omron is convinced that by 1994 it will have a 1.3-billion German marks turnover in sales of industrial products based on fuzzy logic. [passage omitted]

Omron began its research into industrial applications in 1984. In 1989, it even attracted the father of fuzzy logic, Professor L. Zadeh, as adviser. All this research resulted in several products: the FZ-1000 controller (1988), an error diagnostics and anticipation system for machine tools (1990), and the E5AF temperature controller. At this year's Hannover Fair (8-11 April), Omron introduced its fuzzy logic systems to the European market for the first time. The first products will be available some time this year. For the development of real industrial applications, Omron will be cooperating with Inform, a small company affiliated with the Aachen Technical College, and with the universities of Eindhoven and Maastricht.

In the second half of 1991, Omron will bring its fuzzy logic-based systems onto the European market: F3-3000 and FZ-3010 fuzzy logic controllers, and a fuzzy interference board. The fuzzy logic chips themselves will not be available for the time being.

This is a U.S. Government publication. Its contents in no way represent the policies, views, or attitudes of the U.S. Government. Users of this publication may cite FBIS or JPRS provided they do so in a manner clearly identifying them as the secondary source.

Foreign Broadcast Information Service (FBIS) and Joint Publications Research Service (JPRS) publications contain political, military, economic, environmental, and sociological news, commentary, and other information, as well as scientific and technical data and reports. All information has been obtained from foreign radio and television broadcasts, news agency transmissions, newspapers, books, and periodicals. Items generally are processed from the first or best available sources. It should not be inferred that they have been disseminated only in the medium, in the language, or to the area indicated. Items from foreign language sources are translated; those from English-language sources are transcribed. Except for excluding certain diacritics, FBIS renders personal and place-names in accordance with the romanization systems approved for U.S. Government publications by the U.S. Board of Geographic Names.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by FBIS/JPRS. Processing indicators such as [Text] or [Excerpts] in the first line of each item indicate how the information was processed from the original. Unfamiliar names rendered phonetically are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear from the original source but have been supplied as appropriate to the context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by the source. Passages in boldface or italics are as published.

SUBSCRIPTION/PROCUREMENT INFORMATION

The FBIS DAILY REPORT contains current news and information and is published Monday through Friday in eight volumes: China, East Europe, Soviet Union, East Asia, Near East & South Asia, Sub-Saharan Africa, Latin America, and West Europe. Supplements to the DAILY REPORTs may also be available periodically and will be distributed to regular DAILY REPORT subscribers. JPRS publications, which include approximately 50 regional, worldwide, and topical reports, generally contain less time-sensitive information and are published periodically.

Current DAILY REPORTs and JPRS publications are listed in *Government Reports Announcements* issued semimonthly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 and the *Monthly Catalog of U.S. Government Publications* issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

The public may subscribe to either hardcover or microfiche versions of the DAILY REPORTs and JPRS publications through NTIS at the above address or by calling (703) 487-4630. Subscription rates will be

provided by NTIS upon request. Subscriptions are available outside the United States from NTIS or appointed foreign dealers. New subscribers should expect a 30-day delay in receipt of the first issue.

U.S. Government offices may obtain subscriptions to the DAILY REPORTs or JPRS publications (hardcover or microfiche) at no charge through their sponsoring organizations. For additional information or assistance, call FBIS, (202) 338-6735, or write to P.O. Box 2604, Washington, D.C. 20013. Department of Defense consumers are required to submit requests through appropriate command validation channels to DIA, RTS-2C, Washington, D.C. 20301 (Telephone: (202) 373-3771, Autovon: 243-3771).

Back issues or single copies of the DAILY REPORTs and JPRS publications are not available. Both the DAILY REPORTs and the JPRS publications are on file for public reference at the Library of Congress and at many Federal Depository Libraries. Reference copies may also be seen at many public and university libraries throughout the United States.

END OF

FICHE

DATE FILMED

4 NOV 91